MedWet

Raising Public Awareness and Information with regard to Lakes Koronia and Volvi

(Macedonia, Greece)

Final Report

E.T. Koutrakis and G.I. Blionis

December 1995

Greek Ministry of Environment
Environmental Planning Division
Natural Environment Management Section

The Goulandris Natural History Museum
Greek Biotope / Wetland Centre (EKBY)

The Greek Biotope/Wetland Centre was established in 1991, following a proposal to CEC by the Greek Ministry of Environment, Physical Planning and Public Works, under CEC Contract Number B91/91/SIN/8192 between the Commission of European Communities (DG XI) and the Goulandris Natural History Museum.

The pilot project "Raising Public Awareness and Information with regard to Lakes Koronia and Volvi (Macedonia, Greece)", belongs to the MedWet sub-project "Information and Public Awareness" which is coordinated by the World Wide Fund for Nature - WWF, in collaboration with the Greek Ministry of Environment and the Greek Biotope/Wetland Centre and is funded by the European Commission.

This document may be cited as follows:
Koutrakis E.T, and G.I. Blionis. 1995. Raising public awareness and information with regard to Lakes Koronia and Volvi (Macedonia, Greece). MedWet. Greek Ministry of Environment, Physical Planning and Public Works (Natural Environment Management Section). Greek Biotope/Wetland Centre. 78 p. (Gr, En)

Contents

1. INTRODUCTION

1.1. MedWet

Wetlands are systems of great ecological, social and economic value. Yet, a massive loss due to human activities has been recorded throughout the world, mainly during the 20th century. The Mediterranean basin is one of the areas which suffered heavy losses. In South-West France some 80% of the marshes of the Landes have been drained. In Portugal some 70% of the wetlands of the Western Algarve, including 60% of estuarine habitats, have been converted into agricultural land and industrial development zones (Pullan 1988, cited in Dugan 1990). In the Roman era, 10% of Italy (3 million hectares) was covered by wetlands. Only 764.000 ha of total wetland area had remained by 1865, and by 1972 this size had diminished to only 192.000 ha (Hollis & Jones 1992). Before 1930, Greece had three times as much total wetland wetland area as it has today (Psilovikos 1992).

The great value of the wetlands around the Mediterranean Basin, but also their degradation during the 20th century (Jones & Hughes 1992), have been widely recognised and this has given rise to a number of national and international initiatives for their conservation. In February 1991, an international conference entitled "Managing Mediterranean Wetlands and their Birds for the Year 2000 and Beyond" was held in Grado (Italy), with the participation of 280 wetland specialists from 28 countries. The conference adopted the Grado Declaration (Finlayson et al. 1992), whose main goal was defined as: *"to stop and reverse wetlands loss and degradation in the Mediterranean Basin"*.

In order to meet this goal, an integrated initiative was born (supported by the European Commission), bringing together the Ramsar Convention, five EU-member states of the Mediterranean (namely Portugal, Spain, France, Italy, and Greece) and a number of other bodies, such as IWRB, WWF, Tour du Valat, and EKBY, in a flexible but operational scheme, named MedWet.

The preparatory Action Programme of MedWet, which was approved by the EU in March 1992, included activities in 5 major sectors:

- Inventories and monitoring of wetlands
- Management

- Education and training
- Information and public awareness
- Application of research

All MedWet actions aim at *"promoting wise and sustainable use of wetland resources, consistent with the strict conservation of wetland functions and values"*, in accordance with the Ramsar Convention Guidelines (Ramsar Bureau 1992). The concept of MedWet and its importance for the wise use of Mediterranean wetlands was unanimously endorsed by the Kushiro Conference of the Contracting Parties to the Ramsar Convention in June 1993.

1.2. The sub-action of Information and Public Awareness

According to the "Methodological guide" for Information and Public Awareness (Finistauri 1995), this sub-action has to support the MedWet objectives and gain agreement and adoption of MedWet recommendations throughout the Mediterranean Basin. For this reason the main aim is to develop the proper strategies in order:

- to increase the appreciation of wetland values for their social, ecological and economic benefits which respond to essential human needs,
- to show the necessity to change attitudes and uses so as to maintain wetlands intact in favour of nature conservation and human welfare.

According to the same author, Information and Public Awareness (IPA) are the key elements in the process of wetland conservation. They affect attitudes and, in some cases, actions, as a direct consequence. In this way they assist wetland conservation through the implementation or support of activities. The demand for the conservation of wetlands will increase, thanks to the clear demonstration of wetland benefits, which become evident with the implementation of conservation measures.

MedWet selected three Mediterranean countries in order to set up pilot public awareness campaigns: Italy, Greece and Tunisia. In each of the three pilot countries a particular wetland was decided to be identified which would be designed as the "hotspot" of the campaign.

2. ANALYSIS

2.1 The project

2.1.1. Site Selection

Greece has eleven wetlands registered on the list of wetlands of international importance according to the Ramsar Convention. In order to choose the most suitable as the project site, two criteria were applied:

1. threats they face
2. possible implementation of awareness projects or publication of information material in the past

The application of these criteria resulted in the selection of the lakes Volvi and Koronia as the most suitable site for the execution of the Greek pilot project of Public Awareness and Information. The site is facing severe threats, no awareness projects had taken place in the past, and only limited information material had been published for the wider public.

Furthermore, there were several parameters supporting and justifying the selection of this site:

- the project could go on in parallel with the adoption of management measures which were planned by the Ministry of Environment in both lakes and the creation of a Monitoring Station at Lake Volvi.
- there were challenging biotic, abiotic and socioeconomic contrasts between the two lakes.
- the two wetlands' administrative authorities belong to the Prefecture of Thessaloniki, so there was an easy access to the Civil Services that are related to them.
- There were already established contacts among EKBY staff, local social groups that use the two wetlands (e.g. fishermen, farmers) and local NGOs.

2.1.2. The Project Team

The project team was defined on September 1994 and consisted of staff from the Ministry of Environment and EKBY (Table 1). Mr. T. Arapis (MSc) and Mr. G. Blionis (MSc, Ph.D. candidate) were recruited as consultant and collaborator respectively, the former based in Athens and the latter in EKBY's premises in

Thessaloniki. Three specialists were asked to serve as technical advisors for different scientific fields and management needs.

Table 1. The project team.

	Ministry of the Environment	Greek Biotope/Wetland Centre
Steering Committee	Dimitra Spala Maria Antonellou	P.A. Gerakis E.T. Koutrakis
Working Group	Katia Marmara	G.I. Blionis
Project Consultant	T. Arapis	
Technical Advisors	S. Hatziyannakis G. Economidis G. Liponis	

2.1.3. Objective

The objective that was set by the project team, was to promote information and awareness, targeting to the population of the particular area and the whole country, in order to:

- widely propagade the necessity to change attitudes and uses
- ensure local participation in the establishment of a Wetland Management Body
- ensure local support in the enforcement of wetland management measures, which are under preparation.

2.2. The wetland

2.2.1. General characteristics

Lake Koronia (or Lake Agiou Vassiliou, or Lake Langada) and Lake Volvi are situated in Northern Greece, 30-50 km from Thessaloniki. Until the 70's Lake Koronia covered an area of 46.2 km^2 with maximum depth of 8.5 m. The area of Lake Volvi was 68.6 km^2 (second largest lake in Greece) with a maximum depth of 23.5 m. (Pavlidis et al. 1986). At its west side, Lake Volvi is connected with Lake Koronia through an artificial channel, constructed in 1980 (no longer in use) and at its east side, with the Strymonikos Bay (Aegean Sea) through the Richios River (Figure 1).

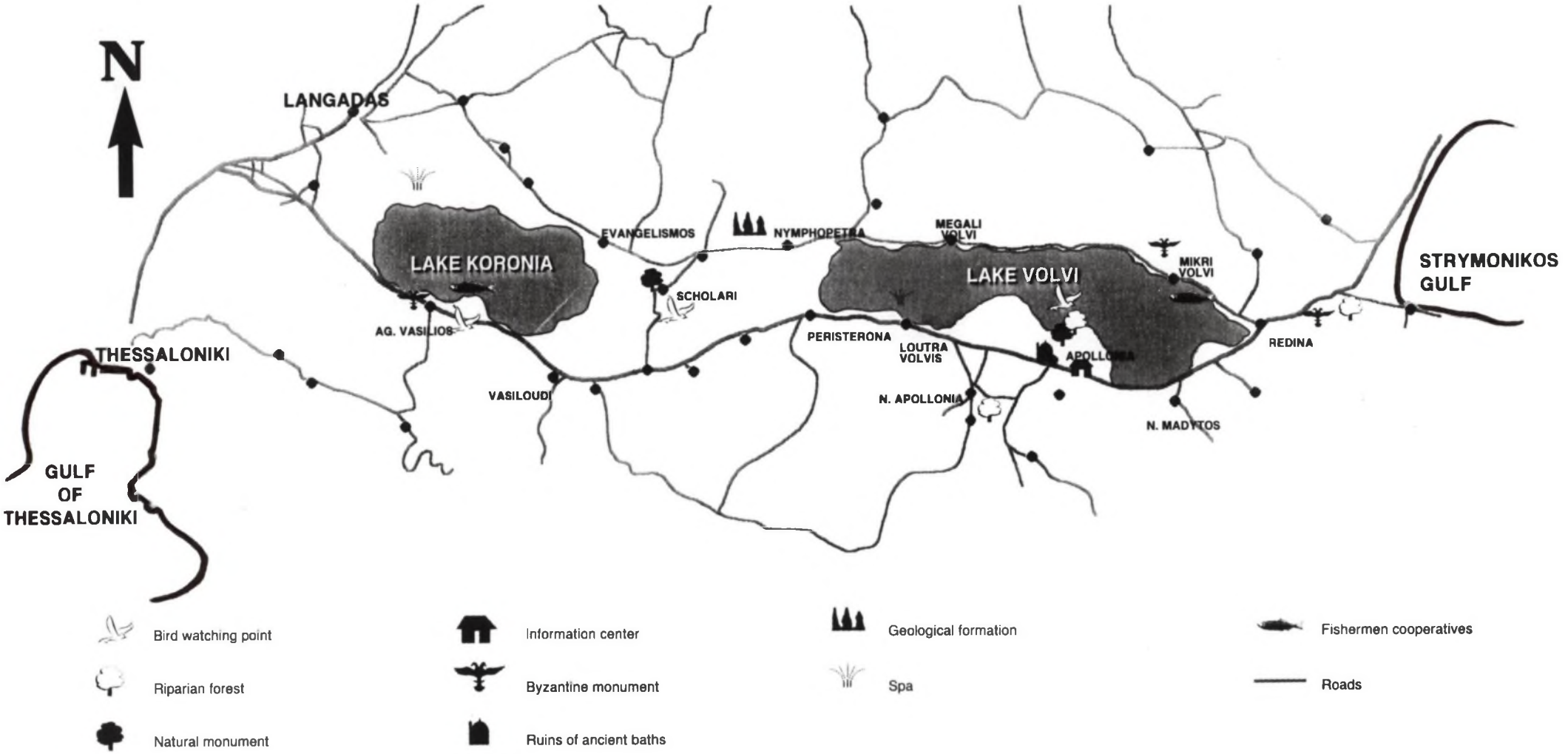


Figure 1. Map of the area of Lake Koronia and Lake Volvi. Symbols are showing monuments and sites of natural beauty or of socioeconomic importance.

A multitude of torrents flow into the lakes carrying silt from a 2,120 km^2 catchment area. Despite the fact that the two lakes are situated close together, they have different characteristics. Koronia is shallow, nutrient-rich and murky, freezing for several weeks in the winter, with a shortage of oxygen during summer. Volvi is deeper, poorer in nutrients and clearer, does not freeze in winter and is well oxygenated even in the hottest months.

2.2.2. Flora and vegetation

The vegetation in the valley can be divided into zones. Starting from the beech zone on the mountain tops, we move down to the zone of oak and chestnut. Further down comes the maquis scrub (on the hills south of Lake Volvi) followed by the lakeside riparian forest of Apollonia. Closer to the lakes we meet semi-aquatic plants, followed by reeds and other marsh plants at the water's edge, plants that grow in the lake mud and others that float on their surface. Alltogether, 336 plant species have been recorded in the area's aquatic environments, and 13 of these are considered as rare. In the last 30 years, 14 species have disappeared from Lake Koronia (including all the bottom-dwelling plants) and 2 from Lake Volvi, while 6 species in Volvi are endangered.

Two rare and ecollogically important riparian forests exist in the area:

- The Apollonia riparian forest, on the estuary of the Melissourgos torrent which ends up in the southern shores of Lake Volvi. From 150 hectares cover area, early in this century, it presently covers only 30 hectares. Main tree species are *Alnus glutinosa*, *Platanus orientalis* and *Populus alba*, while *Salix alba* and *fragilis*, *Populus nigra*, *Ficus carica*, *Pyrus amigdaliformis*, *Juglans regia* can be found, too.
- The Redina riparian forest, in the valley of Richios river which formerly connected Lake Volvi with Strymonikos Bay. The dominant *Platanus orientalis* trees are accompanied by *Salix spp.*, *Fraxinus ornus*, *Cornus mas*, *Nerium oleander*, *Vitex agnus-castus*, etc.

2.2.3. Fauna

Recent studies have revealed an equally rich animal species diversity, consisting of 23 fish species (the endemic *Alosa macedonica*, among them), at least 19 amphibian and reptile species, and 34 mammal species (including hares, squirrels, jackals, foxes, weasels, badgers, martens and the endangered bats and otters). The area has always been home to many bird species, and became even more important as a bird habitat

after 1957 when the two small lakes of Mavrouda and Lantza to the north of Volvi were drained. To date over 200 bird species have been observed.

Many species of birds nest around the two lakes, including the Grey Heron (*Ardea cinerea*), Night Heron (*Nycticorax nycticorax*), Purple Heron (*Ardea purpurea*), Little Bittern (*Ixobrychus minutus*), Little Egret (*Egretta garzetta*), White Stork (*Ciconia ciconia*), Ruddy Shelduck (*Tadorna ferruginea*), Levant Sparrowhawk (*Accipiter brevipes*), Long-legged Buzzard (*Buteo rufinus*), Lesser Spoted Eagle (*Aquila pomarina*), Marsh Harrier (*Circus aeroginosus*), Booted Eagle (*Hieraaetus pennatus*), Roller (*Coracias garrulus*). White Pelicans (*Pelecanus onocrotalus*) come to lake Koronia to feed during summer. Dalmatian Pelicans (*P. crispus*) appear here during migration in winter, together with wintering species like Pochard (*Aythya ferina*) and Tufted Duck (*A. fuligula*), which can be seen in large numbers. A special attraction of the last years in lake Koronia, is a small flock of wintering Flamingoes (*Phoenicopterus ruber*). Booted Eagles, Marsh Harriers, Night Herons and Purple Herons are coming here during migration to be added to the local populations. Nearby, Lake Volvi is too deep for many birds, but the Apollonia forest hosts both species of storks (*Ciconia ciconia* and *C. nigra*) and the Redina Gorge, to the east, one may observe the Short-toed Eagle, (*Circaetus gallicus*), Golden Eagle (*Aquila Chrysaetos*), Booted Eagle, Eagle Owl (*Bubo bubo*) and perhaps the Egyptian Vulpture (*Neophron percnopterus*). Apart from the Grey Heron, quite common during all seasons, species like the Pygmy Cormorant (*Phalacrocorax pygmaeus*), Glossy Ibis (*Plegadis falcinelus*), Buzzard (*Buteo buteo*), Marsh Harrier, etc. can be seen here during summer.

2.2.4. Cultural features

The area was crossed by the Ancient Roman road called Via Egnatia, along the southern coast of both lakes. There are remnants from the Byzantine era, like the well preserved castle of Redina and the tower at Agios Vasilios. In the village of Apollonia, there is a tree under which, according to a local tradition, St. Paul the Apostle has preached in his first visit to Europe. This point is surrounded by some islamic monuments (baths, mosque, and inn), which probably consisted one of the staging posts on Via Egnatia. The Langadas spa was also well known, since the time of Emperor Constantine the Great.

2.2.5. Human activities

The local residents earn their living by crop and animal farming. Fishing is of less economic importance. However, manufacturing is becoming increasingly important in the western part of the region, near the town of Langadas, thus adding another source of income.

Farms cover all lowland areas and some of the hillsides, mostly wheat and tobacco crops. These are not irrigated, but irrigated crops such as maize and alfalfa are covering more and more acreage, while the Langadas area has long been famous for its vegetables. Near the villages and the lakes there are intensive animal farms, while large flocks of sheep and goats graze on the hills above.

2.2.6. Problems

The two lakes share more or less the same problems, but to a different extent (Table 2). The water volume is decreasing due to reduced rainfall and increasing use of irrigation water. Lake Koronia, being shallower and smaller experiences much stronger pressures by the reduced rainfall, greater demand for irrigation water and pollution by agrochemicals, whereas it is also suffering an additional strong pressure by industrial effluents and domestic sewage that is absent from lake Volvi.

Table 2. Main problems of the Lake Koronia and Lake Volvi, in early 1990's.

LAKE KORONIA	LAKE VOLVI
Drop of water level (c. 44cm/year)	Drop of water level (c. 30 cm/year)
Heavy pollution from industrial effluents	No pollution from industrial effluents
Heavy pollution from domestic sewage	Light pollution from domestic sewage
Strong pressure from increasing irrigation water demand	Irrigation water demand is low but increasing rapidly
Assumed high risk of pollution from agrochemicals	Assumed low risk of pollution from agrochemicals
Illegal reedbed burning and cropland encroachment	Illegal reedbed burning and cropland encroachment
Fish production decrease	Fish production decrease
Illegal fishing, uncontrolled fish stocking	Illegal fishing, uncontrolled fish stocking

Seventy two small and medium scale industrial plants have been recorded at the Langadas area, during the last 30 years. Seventeen of these are small-scale dyeing-

finishing plants, of which only 4 have an operation permit. Some of the plants have constructed installations to treat their effluents, which they are rarely put to work because of high operational costs. All the industrial effluents are disposed into nearby torrents discharging into Lake Koronia.

The Environmental Bureau of the Ministry of Macedonia-Thrace has data from several chemical analyses of effluent samples, conducted over the last five years. In 59% of the samples, the pH value exceeded 8, which is the upper limit accepted by Greek regulations. Furthermore, there were particular cases where the pH value exceeded 11!

Apart from the industrial effluents, the sewage effluents from the city of Langadas are still disposed untreated to the nearby torrent. The local authorities are in search of the funds needed for the construction of a biological treatment plant. Both lakes receive runoff water from the surrounding fields.

The most usual form of biotope destruction is the encroachment of fields into natural wetland areas, after unlawful reed burning. During the last years, the water surface drop has led to the exposure of large areas of lakes' bottom, which are plowed illegally and turned into cultivated land. To this land, irrigation water is usually pumped directly from the lakes' waters. The fines decided by the authorities against perpetrators are not collected.

Regenerating wetland vegetation of the exposed bottom areas is heavily grazed and therefore suppressed.

2.3. The situation in the communication media

One radio station and one local newspaper are based in Langadas. Furthermore, the area by being close to Thessaloniki, is exposed to the messages of several TV and radio stations, plus two daily newspapers and one bimonthly environmental magazine. The media that were regularly contacted during the project duration are shown in Table 3.

Table 3. Media contacted regularly throughout the project.

National daily newspapers	National weekly newspapers	Newspapers of Thessaloniki	TV stations	Thessaloniki radio stations	Magazines
Avgi	Vima	Makedonia (daily)	ET-2	Paratiritis	Nea Oikologia
Avriani	Pontiki	Thessaloniki (daily)	ET-3	Radio-A	Ecotopia
Eleftheros Typos	Kyriakatiki Eleftherotypia	Ell. Vorras (weekly)	Mega	Radio 88.5	4 - Trochoi
Eleftherotypia	Typos tis Kyriakis	Bonus	Antenna	Antenna FM	
Ethnos			Sky	FM 100	
Express			New	Radio Thessaloniki	
Geniki Dimoprasion			TV Makedonia	Radio 95,8	
Imerisia			TV Serres	FM 105	
Kathimerini			TV 100		
Kerdos					
Nea					
Niki					
Rizospastis					

3. IDENTIFICATION OF HYPOTHETICAL TARGET GROUPS

3.1. Identification of the target groups present in the area

The specific target groups identified on the basis of their current or potential role, are shown in Table 4. Farmers, fishermen and small industrial plant owners are involved in economic activities, while hunting is prohibited at the moment. Decision makers include those at the EC, national, regional, prefecture and local level. Teachers, schoolchildren and scientists may exert a strong influence in favor of environmental conservation. Finally, the local residents were considered as a distinct target group of the general public.

Table 4. Classification of target groups in the area of the lakes Volvi and Koronia.

Classes	Target groups
Users/Potential users	Farmers, fishermen, small industrial plant owners, hunters
Decision makers	EC-, national-, regional-, prefectural-, local-level
Influencers	Local schools, researchers
Supporters	Environmental NGOs, cultural NGOs
General public	Local residents, wider public

3.2. Evaluation of hypothetical target groups

The target groups defined in the previous paragraph were evaluated in order to decide which would be included in the communication programme, according to the criteria (conservation attractiveness, communication attractiveness, communication inter-relationships and economic advantages) and the value scale (5 for high effectiveness to 1 for low effectiveness) given by the "Methodological guide" of Information and Public Awareness (Finistauri 1995). The mean value of the various criteria used was considered as an index characterizing the "suitability for awareness" of each hypothetical target group. The results are shown on Tables 5, 6 and 7.

Table 5. Evaluation of hypothetical target groups of users/potential users, according to a scale of 5 (high effectiveness) to 1 (low effectiveness).

Criteria	Hypothetical target groups of users/potential users			
	Farmers	Fishermen	Small industrial plant owners	Hunters
Size	3	2	2	1
Conservation Attractiveness	5	2	5	2
Communication Attractiveness	1	5	1	2
Communication Interrelationships	3	2	3	1
Economic Advantages	3	5	1	3
INDEX	**3**	**3.2**	**2.4**	**1.8**

Table 6. Evaluation of hypothetical target groups of decision makers, according to a scale of 5 (high effectiveness) to 1 (low effectiveness).

Criteria	Hypothetical target groups of decision makers				
	EC	National	Regional	Prefecture	Local
Size	1	1	1	1	1
Conservation Attractiveness	1	4	3	3	3
Communication Attractiveness	1	4	3	4	3
Communication Interrelationships	4	5	4	5	5
Economic Advantages	1	4	4	4	4
INDEX	**1.6**	**3.6**	**3**	**3.4**	**3.2**

Table 7. Evaluation of hypothetical target groups of influencers, supporters, local residents and the wider public, according to a scale of 5 (high effectiveness) to 1 (low effectiveness).

Criteria	Hypothetical target groups of influencers, supporters, local residents and the wider public				
	Teachers/ schoolchildren	Researchers	NGOs	Local residents	Wider public
Size	3	1	1	4	5
Conservation Attractiveness	4	5	2	2	1
Communication Attractiveness	5	4	5	2	1
Communication Interrelationships	5	3	3	4	4
Economic Advantages	4	5	5	1	1
INDEX	**4.2**	**3.6**	**3.2**	**2.6**	**2.4**

The hypothetical target groups were divided in four categories, according to their evaluation and consequently to their suitability for an information & public awareness project:

a. low suitability target groups (0-2): hunters, EU-decision makers
b. medium suitability target groups (2-3): small industrial plant owners, local residents, wider public
c. high suitability target groups (3-4): farmers, fishermen, Greek decision makers, NGOs, researchers
d. very high suitability target groups (4-5): schools

The team decided that the "low suitability target groups" should not be adressed. There was a recent regulation that prohibited hunting for 3 years, thus it was not of any priority to contact hunters. Likewise, the task of sensitizing EC decision makers was considered to be a non cost-effective task. It was also decided that the "medium suitability target groups" should be contacted in an indirect way. Small industrial plant owners have strong interests in the continuation of their current non-sustainable activities and are not easily persuaded directly. It was decided that there were more chances of sensitizing them indirectly, through other target groups. Our primary focus were "high" and "very high suitability" target groups. Of course, NGOs and researchers are already informed and environmentally aware to a high degree, and therefore important as collaborators in the delivery of the conservation message.

4. MAIN MANAGEMENT ISSUES

4.1. Selection of main management issues

A general overview of the main problems of Lakes Koronia and Volvi was already been given (2.2.6). Using the criteria of a) importance, b) representativity and c) rank of priority, the project team concluded to the following three management issues, which were considered suitable for public awareness:

- ***Use of water resources***

  The water resources of the area are facing problems of both quantity reduction and quality deterioration. Consequently, there is a great need for information, expertise, and ideas for a wiser use of water resources.

- ***Fishery management***

  Fish production is rapidly decreasing during the last decades, a fact which directly reflects the situation of the lakes. The social impact of the fish production decrease and the need to update the regulations concerning fishing in the lakes, were added to the causes that led the project team to select fishery management as one of the most important management issues.

- ***Use of agrochemicals***

  In both irrigated and non-irrigated fields around the lakes, the misuse of agrochemicals is not rare. Direct damage to farmers' health may be caused by careless application of pesticides as well indirect damage to the consumers of the unwisely sprayed fruit and vegetable products. Furthermore, according to data collected in other countries, it is postulated that an undetermined amount of residues of certain agrochemicals may be washed to the torrents of the area, or directly into the lakes. This may cause deterioration of the water quality. The fact that the adverse effects of agrochemicals misuse has not been adequately documented in this area, is not a good enough reason to neglect this serious human health issue. Prevention of a threat is preferable to therapy.

4.2. Evaluation of hypothetical target groups' response to the main management issues

In the present work, the project team conducted a subjective assesement of the response of the hypothetical target groups to the main management issues, through personal contacts and review of the existing bibliography. Based on the

Methodological Guide (Finistauri 1995), the value system of Table 8 was deviced, in order to produce a succinct assessement:

Table 8. Value climax for the criteria proposed by Finistauri (1995) to be used in the assessement of response and attitude of the hypothetical target groups towards the main issues.

Value	Criteria			
	Awareness on the issues	Attitude towards conservation measures	Involvement in conservation actions	Image of wetlands
1	None	Very negative	None	Very negative
2	Faint	Negative	Rare	Negative
3	Little	Indifferent	Occasional	Indifferent
4	Fair	Positive	Frequent	Positive
5	Very good	Very positive	Continuous	Very positive

The results of this evaluation process for each hypothetical target group (apart from the "low suitability target groups") are presented in Table 9. Small industrial plant owners were considered to be negative, the wider public rather indifferent, farmers are moderately positive while decision makers, fishersmen, schools, NGOs and especially researchers, are very positive towards the main issues that were set by the project team.

Table 9. Evaluation of hypothetical target groups response to the main issues set by the project.

Hypothetical target groups	Awareness on the issues	Attitude towards conservation measures	Involvement in conserv. actions	Image of wetlands	INDEX
Greek decision makers	4	4	4	5	4.25
Fishermen	4	5	3	5	4.25
Farmers	4	2	3	4	3.25
Small industry owners	1	1	1	3	1.5
Teachers/Schoolchildren	3	5	3	5	4
Researchers	5	5	4	5	4.75
NGOs	4	5	4	5	4.5
Local residents	3	2	1	4	2.5
Wider public	2	3	1	4	2.5

5. SELECTION OF OPERATIONAL (FINAL) TARGET GROUPS AND THEIR CHARACTERISTICS

The results of the evaluation of hypothetical target groups' response to the main issues (4.2) were considered together with the results of the evaluation of hypothetical target groups themselves (3.2).

The "medium suitability target groups" were found to have variable interest in the main issues. Small industry owners are somewhat negative while the wider public is rather indifferent. From the "high" and "very high suitability target groups", only farmers were moderately positive whereas all the others were very positive.

The desired image should be the one where all the target groups would have a positive response and eagerness to contribute to the conservation efforts. In order to eliminate this image gap, the project team considered for each image dimension a) the contribution to the project's overall desired results, b) the actions necessary (structure and communication changes), c) the cost, d) the time.

The project team then proceeded to the final selection of the target groups (Table 10). Greek decision makers, fishermen, farmers and schoolchildren (along with their teachers) were selected as the operational target groups. The fact that they have a positive attitude towards the main management issues leaded us to use collaboration more than other public awareness tools, as will be seen in paragraph 7.1., too.

Table 10. Final selection of target groups.

Hypothetical target groups	Selection category
Hunters	-
EC decision makers	-
Small industrial plant owners	secondary
Local residents	secondary
Wider public	secondary
Greek decision makers	OPERATIONAL
Farmers	OPERATIONAL
Fishermen	OPERATIONAL
NGOs	supportive
Researchers	supportive
Teachers/Schoolchildren	OPERATIONAL

The small industrial plant owners and the general public were considered as secondary target groups, since despite the fact that they need public awareness (they are negative or indifferent towards the main management issues), they were evaluated as "medium suitability target groups". It was decided to contact these groups in an indirect way. In addition, local NGO's and researchers were considered as supportive target groups, i.e., supporters to rather than targets of the communication campaign.

5.1. Greek decision makers

Decision makers at the national level, apart from the Ministry of Environment, include the Ministries of Agriculture, of Industry, and of Macedonia-Thrace. Decision makers at the regional level include the Regional Divisions of Environment and Physical Planning, of Water Resources, of Land Reclamation, as well as the Forest Inspectorate, while at the prefecture level there is a multidude of services including:

a) The Division of Agriculture
b) The Department of Fisheries and a Fishery Inspection Station located at the village Agios Vasilios where the fish-pier of Lake Koronia is situated.
c) The Division of Hygiene
d) The Division of Land Reclamation
e) The Division of Programming & Development
f) The Division of Industry

Decision makers at the local level include 18 towns and villages.

5.2. Fishermen

They can be divided in amateurs and professionals:

- Amateurs: they usually live in the villages near the lakes but some of them may come from urban or semiurban areas as well. Usually amateur fishermen prefer to fish in the sea rather than in the lakes. In lake Volvi, the fishing rights are contracted to the local Fishing Cooperative, therefore amateurs are not allowed to fish by boat in the lake. They are only allowed to fish from the shore.
- Professionals: this is the most important group because fish production is closely related to the condition of the lakes. Every human pressure on the lakes affects the fish populations. Therefore, fishermen, despite the fact that they are among the poorest members of the society, can easily be convinced for the necessity to protect the lakes, since conservation will lead to increased quantity and quality of fishes.

The professionals was the main focus of the project. There are two Fishermen Associations, one for Koronia and one for Volvi.

5.3. Farmers

Their potential influence on the wetlands is direct, i.e., by using water for irrigation, as well as indirect, i.e., through the misuse or overuse of agrochemicals. Many farmers, even though they are aware of the values and of the vulnerability of their wetland, they feel they have no alternative but to overuse it in order to earn a living.

5.4. Teachers/Schoolchildren

The children living in the area around the lakes are the future users of these lakes. It is very important to make them aware of the values of these wetlands. Through them the message also passes to adults. An efficient way to influence children is to inform teachers. Teachers are quite often in need of information in order to educate and sensitize schoolchildren on environmental issues. They have also the opportunity to contact a wide public, having an increased ability of persuation.

6. DEFINITION OF THE COMMUNICATION OBJECTIVES

The objectives set by the project team for each target group, were the following:

Decision Makers

a) to provide them with an integrated view of the problems faced by the lakes,
b) to promote the integrated approach and actions to the problems of the lakes, as well as the better cooperation among services,
c) to improve controls of the management in the two lakes.

Fishermen

a) to establish relations of mutual trust with the project team,
b) to inform them about the problems that the lakes face,
c) to support local Cooperatives and make them feel important for the conservation of the lakes,
d) to support cooperation with experts,
e) to stop uncontrolled fish stocking.

Farmers

a) to make them fully aware of the positive and negative interactions between wetland and agricultural ecosystems,
b) to motivate them towards collective action,
c) to promote wise use of water and agrochemicals.

Teachers/Schoolchildren

To supply teachers with concrete information, in a suitable form to be used by them in increasing the awareness of their students.

7. PLANNING OF THE COMMUNICATION CAMPAIGN

7.1. Campaign tools and messages

Decision Makers

Our messages towards decision makers were:

- "Better coordination means better conservation" and
- "The necessary restrictions or changes of activities must be coupled with financial support and new ideas for ecodevelopment".

In our communication campaign, seminars, "round table" discussions and use of printed material were included, as well as lobbying activities, technical meetings among the various civil services and a conference with presentations on the problems of the two lakes. Local authorities were to be contacted directly with the purpose of establishing a communication web among them. The most environmentally active heads of local goverment agencies were selected for a closer collaboration.

Fishermen

Our message towards fishermen was:

- "Better coordination with experts and support of the conservation measures can protect the lakes, the fish stocks and the income deriving from them".

Contacts with the Fishing Cooperatives were selected as an appropriate means to establish relations of mutual trust through technical assistance. Use of printed material, invitations to special seminars and assistance from the mass media were used in order to make them understand both the problems and the role they have in the resolution of these problems. Moreover, it was considered useful to participate in the international exhibition AGROTICA '95, with a stand, in order to propagate the campaign and facilitate further contacts.

Farmers

Our messages towards crop farmers were:

- "What is good for the lakes is also good for agriculture, and vice-versa",
- "Current agricultural practices lead towards the decline of agriculture itself and the degradation of the environment"
- "Adopting sustainable practices is the only way to ensure agriculture for the future".

Scientific expertise was planned to be sought, in order to propose solutions. Printed material and press releases would be used in order to share the message of wise use of water and agrochemicals with this target group. It was considered useful to participate in the international exhibition AGROTICA '95, with a stand, in order to propagate the campaign and facilitate further contacts with farmers, too.

Teachers/Schoolchildren

Our messages towards teachers and subsequently schoolchildren was:

- "the lakes provide excellent opportunities for education and fun" and
- "protecting the lakes is like protecting our home".

In order to spread our messages to the schoolchildren, we decided to inform teachers and make them more capable to implement environmental education programmes. Thus, seminars were scheduled for teachers, where lectures by members of the programme were planned. Furthermore, it was decided to prepare "The suitcase of Volvi and Koronia", an integrated environmental education package, that would enable teachers to prepare series of presentations about the lakes for schoolchildren. This suitcase would include texts, information, slides, videos, games and ideas for simple scientific projects, with the ultimate goal to make the schoolchildren aware of the functions and values of these wetlands.

General public

The general public was planned to be contacted through printed material and press releases.

Cooperation

EKBY sought cooperation with local NGOs and other bodies. It was absolutely necessary to have local collaborators do most contacts with local people since the latter often resent the interference from outsiders. The campaign also used experienced technical consultants to provide advice on management problems. Moreover, close cooperation was sought with local school teachers starting with the Education Inspectorates of the area.

Table 11. Tools used in the communication campaign according to the main objectives which were set by the project team.

Target groups	Main objectives	Tools
Decision makers	Provide them an integrated view of the problems. Improve the management of both lakes.	a) meetings b) conference c) printed material d) technical assistance e) lobbying
Professional fishermen	Support local Cooperatives. Stop uncontrolled fish stocking.	a) technical assistance b) personal contacts c) printed material d) press releases e) local events
Farmers	Promote wise use of water and agrochemicals	a) technical assistance b) printed material c) press releases
Teachers/ Schoolchildren	Raise awareness of the values of the wetlands	a) the suitcase of Koronia and Volvi b) printed material
General public	Raise awareness of the values of the wetlands	a) printed material b) press releases

7.2. Communication campaign priorities and timetable

The major priorities of the communication campaign, were to promote information, encourage cooperation, provide scientific expertise, and prepare educational material. In order to follow these priorities we prepared a workplan for the implementation of the project's actions (Table 12).

Three official meetings (commencement, interim, and closing) were planned to be the cardinal points of the campaign, in the communication with the target groups. Posters, leaflets and press releases were produced in order to spread our messages, not only to the final target groups but also to the secondary (industries, tourists, wider public). Technical meetings were programmed to provide expertise to decision makers, while the organisation of, or participation in, special events addressed more than one target groups. Finally, considerable time and labour was planned to be devoted to the preparation of the environmental education package "the suitcase of Volvi and Koronia".

Table 12. Project workplan (EKBY 1994).

PHASE 1 April-September 1994	PHASE 2 October 1994-January 1995	PHASE 3 February-June 1995	PHASE 4 July-December 1995
Personal contacts Commencement Meeting Press releases	Technical meetings Preparation of the suitcase of Volvi and Koronia Press releases Preparation of posters and leaflets Outdoor panels informing users about the values of the two wetlands Lobbying activities Visits to the target groups Technical assistance to fishermen and farmers	Technical meetings Interim Meeting Press releases Preparation of posters and leaflets Organisation of a conference Lobbying activities	Participation in local events Closing Meeting Press releases Preparation of posters and leaflets Proposals to promote sustainable development

8. PERFORMANCE OF THE COMMUNICATION CAMPAIGN

Preparatory work

Articles, studies, official reports and management proposals were collected in order to create an archive of information on the area, and facilitate the next stages of the project. The raw data of an already existing sociological survey concerning the population of seven villages of the area and the attitudes towards the wetlands, conducted by EKBY staff in 1992, was elaborated in tables. Addresses along with telephone and fax numbers of civil services, local authorities, local associations (e.g. fishermen, farmers), local environmental or cultural groups, were included in a list to be used in every occasion.

Commencement Meeting

The Commencement Meeting (CM) was held in the EKBY's premises in Thessaloniki, on 7 October 1994. Over 60 individuals responded eagerly to the invitation, including representatives from all civil services involved in the management of the wetlands and their hydrological basin, users of the wetland and its perimetric zone, representatives from municipalities, scientists, members of local NGOs and the coordinator of the Red Alert Project of WWf-Greece.

The aim of this meeting was the presentation of the project's objectives and expected benefits, and the establishment of a cooperation and information exchange network among participants. The meeting also included four presentations on the abiotic and biotic features of the area, the values of the two wetlands and the problems associated with irrigation, crop production and fishing. The presentations were given by the technical advisors of the project.

Data on the rainfall (Figure 2), acreage of land cover/uses in the catchment area (Figure 3), acreage of crop types around the lakes (Figure 4) and the decrease of fish production (Figure 5) were presented.

The main crops (cereal and tobacco) are not irrigated, but there is a considerable acreage which is irrigated (maize and alfalfa). The irrigated crops over the whole Mygdonian basin are estimated to cover an area equal to that of the surface of the two lakes. Most of this irrigated area is found around lake Koronia. This shows that Koronia is much more influenced by farming than Volvi.

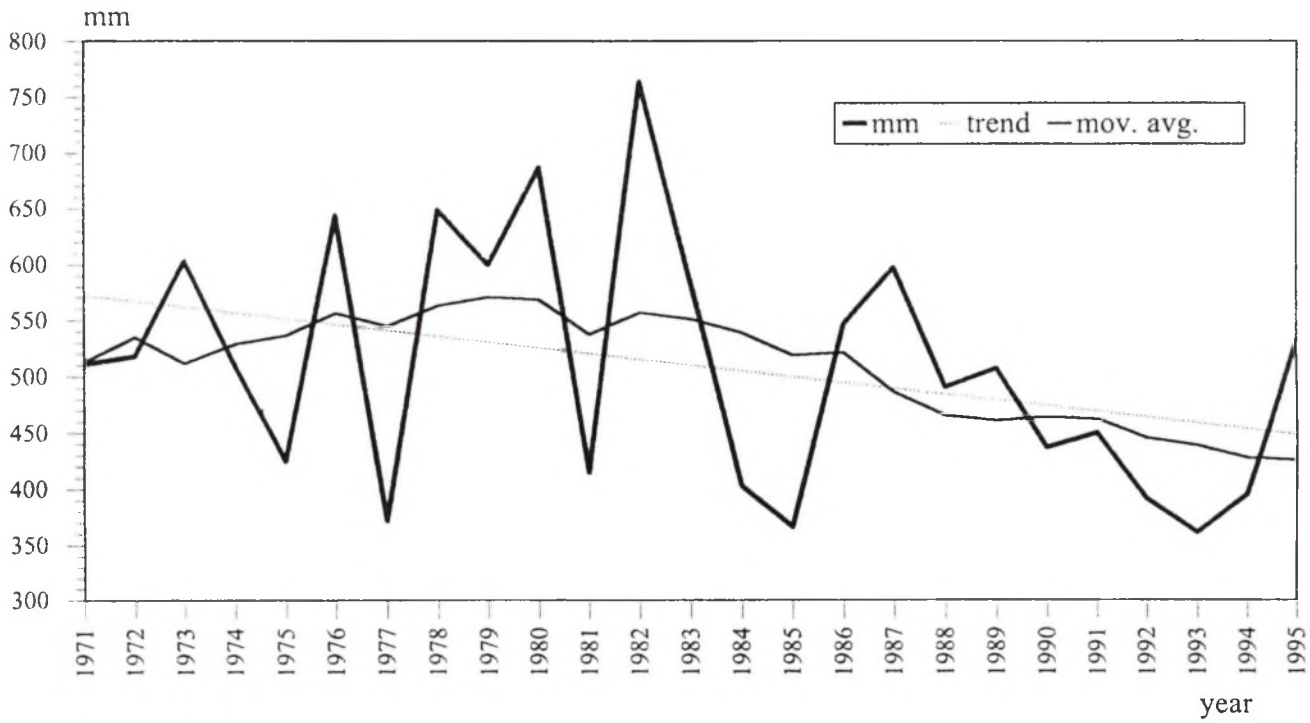


Figure 2. Annual rainfall, trend and moving average, in Langadas area (data from the Arboriculture Station of Langadas).

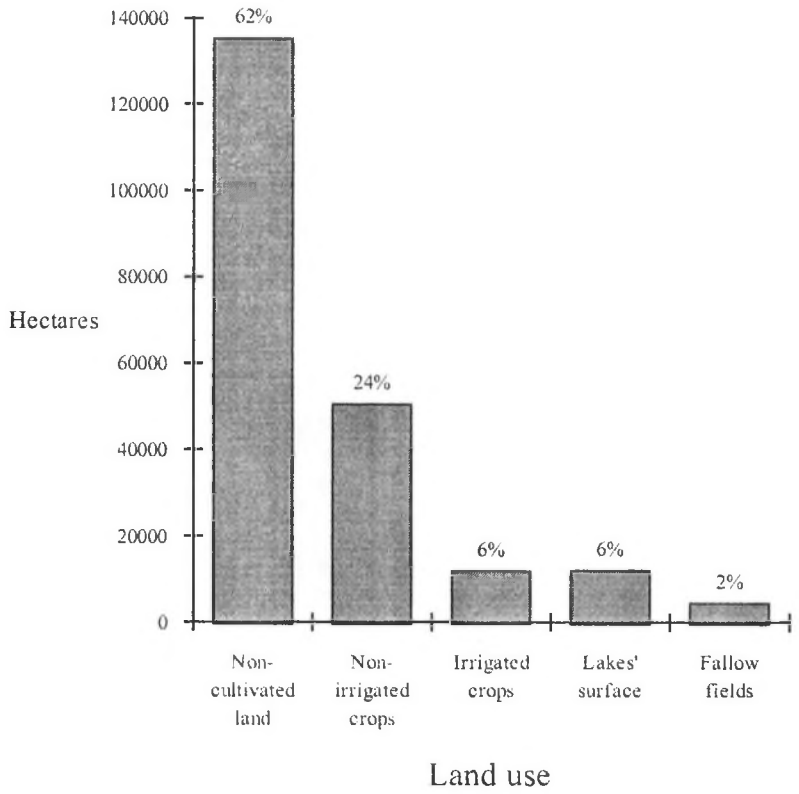


Figure 3. Land cover/use in the catchment area of Lakes Koronia and Volvi, in 1993 (data from the archives of the Division of Agriculture).

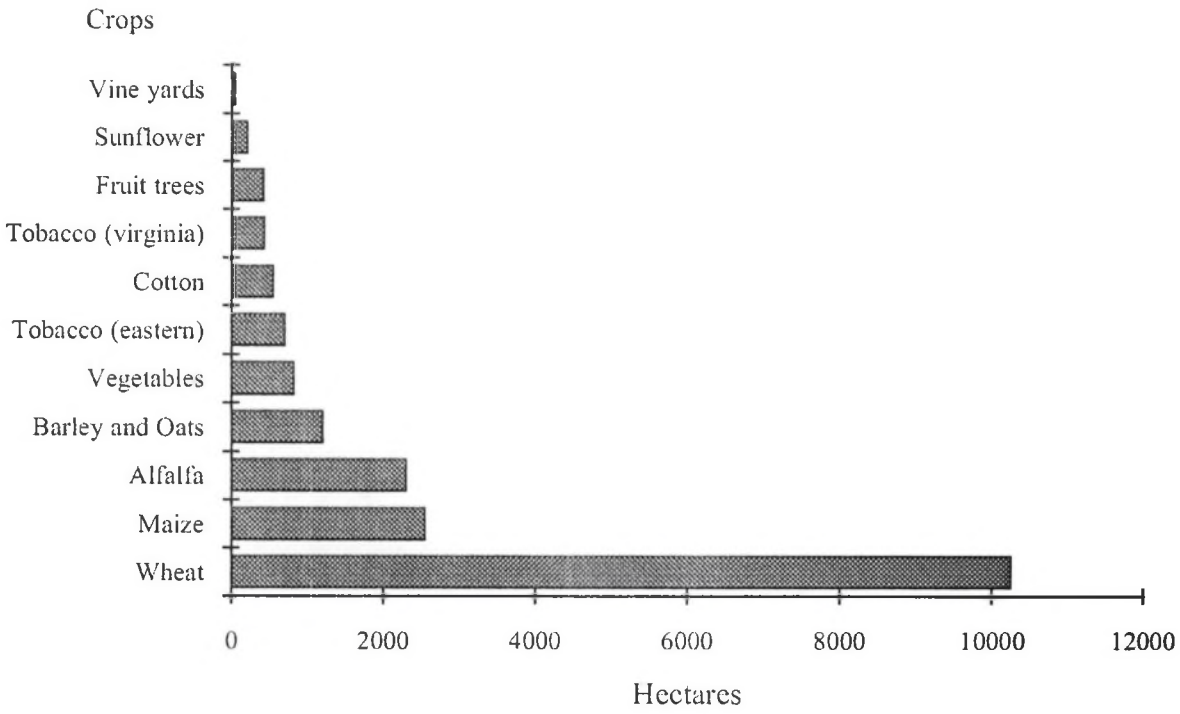


Figure 4. Hectares covered by various crops in the plain of Lakes Koronia and Volvi, in 1994. Most wheat, barley, oats, eastern type tobacco and vineyard fields are non-irrigated and consist almost 40% of the total cultivated area. The others are mostly irrigated (60%), (Liponis & Blionis 1995).

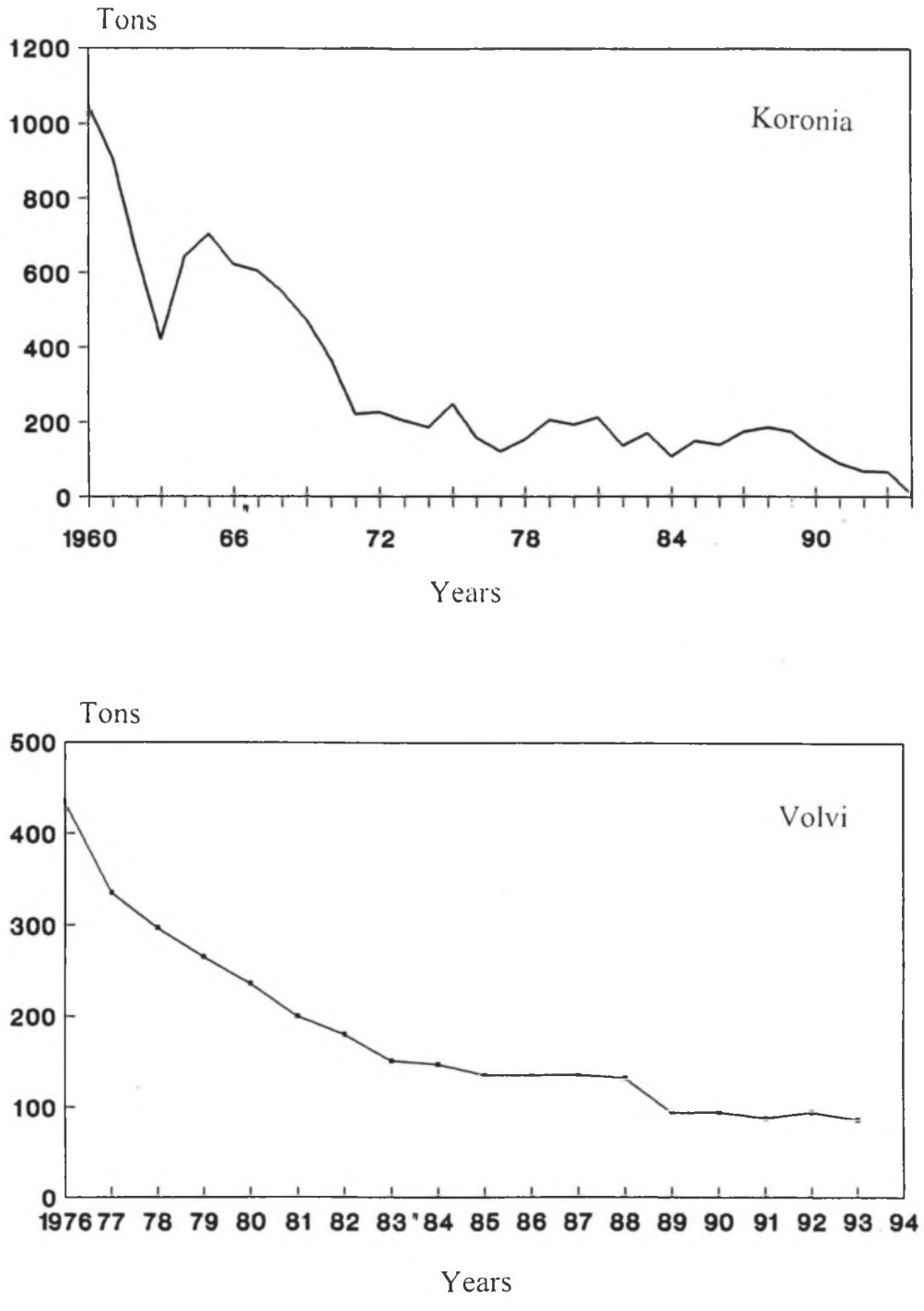


Figure 5. Fish production of lake Koronia, since 1960 and of lake Volvi, since 1976, (Ekonomidis 1995).

Pollution by industrial effluents, domestic sewage and agricultural runoff, as well as the reduction of the water volume were considered as the main reasons for the fish production decrease. In Koronia, the production dropped from 1050 tones in 1960, to only 67 tones in 1993. In Volvi, the production dropped from 435 tones in 1976, to 90 tones in 1993. These facts had a series of social and economic impacts on fishermen, thus a) reduction of their income, b) discouragement of young men from undertaking the profession, c) reduction of the numbers of professional fishermen and d) weakening of their lobbying power.

At the end of the meeting there was a discussion, in which the other participants contributed considerably with regard to problem identification and solution approaches. All participants approved the approach of the project and agreed to offer their support in its following stages. A report on the results of the CM was prepared (available in Greek), including summaries of the presentations along with remarks and suggestions of participants. This report was used as baseline information for the following stages.

Government Inter-Service Technical Meeting

A Government Inter-Service Technical Meeting (GIS-TM) was organised and conducted at the premises of the Greek Biotope/Wetland Centre in Thessaloniki on 8 December 1994. During this meeting, the Draft Joint Ministerial Decision (JMD) was presented to all concerned public administrators, by Mrs K. Marmara and Mrs M. Antonelou (Ministry of Environment, Natural Environment Management Section). Emphasis was placed on the need to issue the JMD the soonest. It was also noted that MedWet could facilitate this procedure by promoting the JMD to the Local Authorities.

The comments of public administrators and local authorities were sought, in order to proceed to a first elaboration before the final formation of the JMD.

Participation in the International Fair of Thessaloniki (AGROTICA '95)

A stand with particular reference to the project was exhibited in the international fair "AGROTICA '95" (1-5/2/1995), held at the premises of the International Fair of Thessaloniki. The fair was visited by over 100.000 people. Many visitors showed a strong interest in the work done through MedWet.

Conference on the Biological Research related to Koronia and Volvi

A conference entitled "Lakes Koronia and Volvi - Biological Research and Information" was successfully organised and held, in collaboration with the Panhellenic Association of Biologists and the Greek Ministry of Environment (3.2.1995), within the framework of AGROTICA '95. Eight lectures on the biological parameters of the lakes (such as phytoplankton, fish fauna, bird species, plant communities) and the impact of human activities on them, were given by researchers with field experience in that particular area. It must be noted, that this was the first scientific conference ever organised for the area of the two lakes and it was attended by by over 150 scientists.

Technical Meetings and Technical Reports

On 7.3.95, the first technical meeting was held at the premises of EKBY. The participants were irrigation experts from civil services exclusively. The disscussion was focused on the hydrological situation and the management of irrigation water in the lakes' catchment area. Data concerning the water level of lake Koronia, were provided by the Land Reclamation services and showed a continuous decrease since 1987, which exceeds 2.5 meters (Figure 6). In 1994, the maximum depth was almost 2 meters, while the mean depth was about 1.5 meters. If the above data is to be projected to the future, the mean water level decrease of about 30 cm per year will lead to complete drainage after a 3 year period.

The maximum depth of lake Volvi was estimated at 23.5 m in the early 70's (Pavlidis 1986 and Psilovikos 1977), while measurements in the 90's were reported a maximum depth of 19 m (Valoukas in press). Due to shortage of local data, we considered a drop of water level of about 1.5-2 meters as most probable during the period 1986-1994. Today, Lake Volvi no longer overflows into the Richios river, which is fed only from underground springs, thus losing most of its water.

All participants agreed that lake Koronia had reached its limits as a source of irrigation water, while not everyone agreed that the same stood true for Volvi. The meeting showed that there was no official control on drillings for irrigation water. All drillings were considered as lawful (by the end of the project we discovered that the Prefecture Division for Water Resources Management and Land Reclamation had issued 2130 permits for irrigation drillings). Thus, the need for control and restrictions over irrigation drilling was demonstrated.

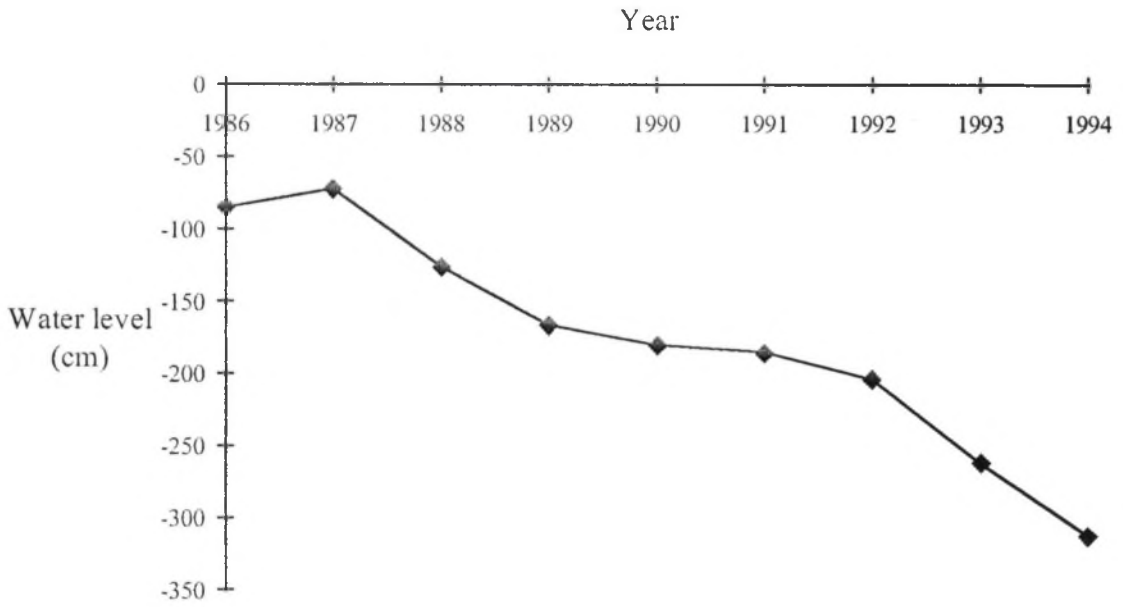


Figure 6. Lake Koronia's water level decrease, since 1986 (data provided by the Land Reclamation service of the Prefecture of Thessaloniki).

In April, Professors of Ichthyology from the Aristotle University of Thessaloniki and experts from local civil services were contacted for the preparation of a report on "problems and management of fisheries in lakes Volvi and Koronia and proposals for wise use". Agriculture experts from the regional agricultural civil service, were also contacted, for the preparation of another report on "problems and use of agrochemicals around the lakes".

On 26.5.95, and after the preparatory work which was already described, three technical meetings were held at the premises of EKBY, on the same main management issues set by the project team (irrigation water, agrochemicals, fisheries). These meetings were followed by the final elaboration of three technical reports, which describe the present situation concerning the three issues and provide a series of management proposals each (Blionis & Hatziyiannakis 1995, Liponis & Blionis 1995, and Oikonomidis 1995). In order to illustrate the situation of irrigated areas around the lakes, we prepared a map (Figure 7), which was distributed to decision makers.

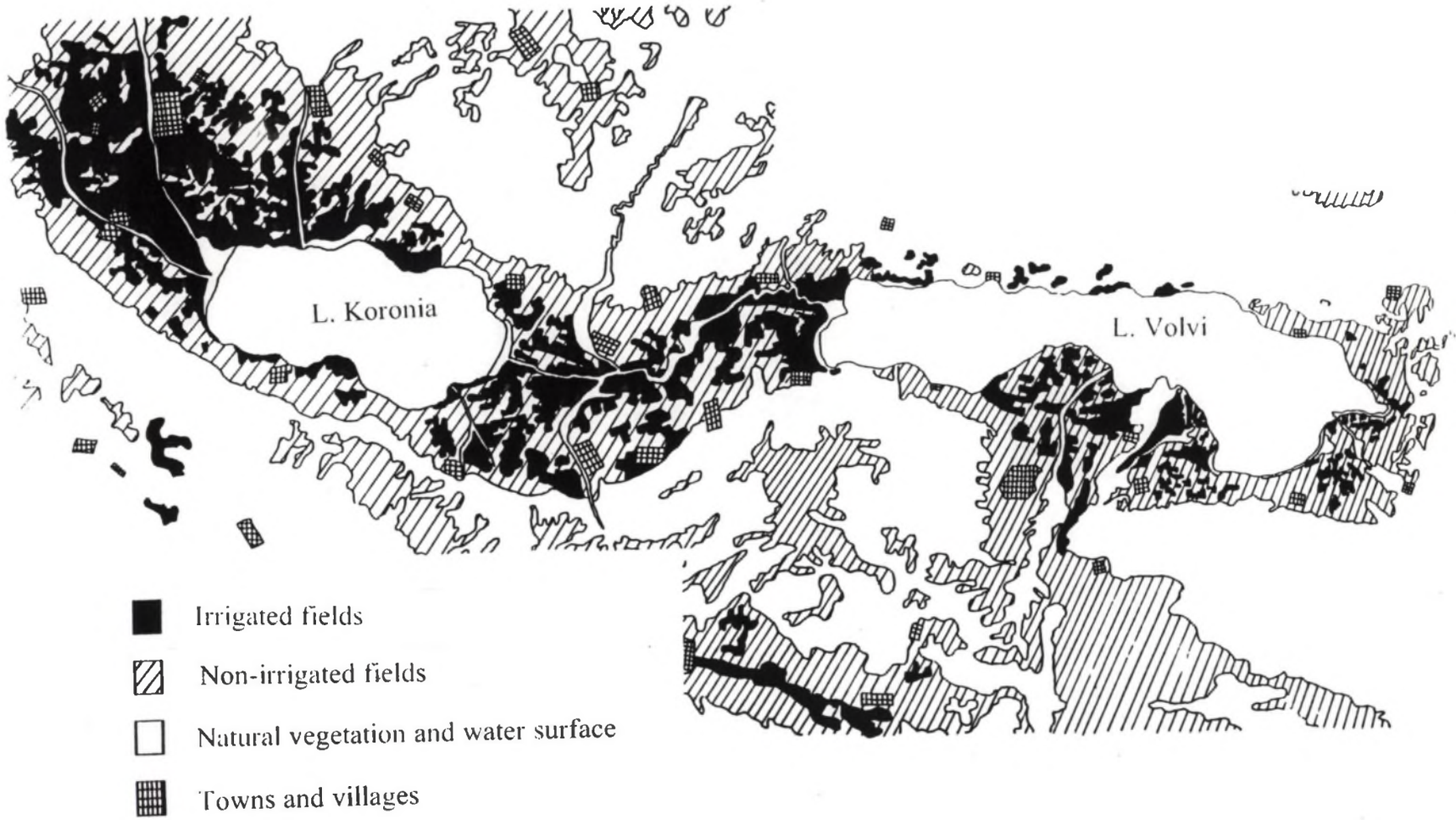


Figure 7. Irrigated areas around lakes Koronia and Volvi (modified from Sekliziotis & Papakonstantinou, 1992). It is obvious that the majority of irrigated fields are situated around lake Koronia and more specifically at Langadas area.

During summer, several visits to the two lakes together with bibliographical survey resulted in the elaboration of a technical report describing the potential of the area for ecotourism and proposing future ecotourism activities (Blionis 1995). This report was supplementary and it was not mentioned in the project's proposal (EKBY 1994) or the project contract. However, it was considered as something that would increase the interest for environmental conservation and alternative environmentally-friendly economic activities.

In August and September 1995, massive fish and bird kills occurred at lake Koronia. This event impressed to everyove the urgent need for remediation and management measures. The project team issued additional technical proposals about the treatment of industrial effluents and the use of irrigation water from lake Koronia.

A short presentation of all the technical proposals made by the project are shown in Appendix II.

Interim Meeting

The Interim Meeting was held on Wednesday 14.6.95, at the village of Nea Madytos, near lake Volvi, in collaboration with the Authorities of Nea Madytos and the support of the Prefectural Committee for Constructions and the Environment. The progress and first results of the project were presented, as well as the three technical reports on irrigation water, agrochemicals, and fisheries. Remarks on the draft Joint Ministerial Decision were made by Local Authorities. The meeting was attended by more than 60 representetives of civil services, scientific institutes, NGOs and other local bodies, and proved the importance of the close cooperation with the Local Authorities.

Co-organization of local events

- Participation in the local festival, the "Day of Liparia" (26.7.95), and close collaboration with the Fishermen Association of Lake Volvi. (Liparia=*Alosa macedonica*, endemic fish species of lake Volvi).
- Collaboration with "Anaptyxiaki S.A." (a development body controlled by local governement) for the organisation of a seminar on ecotourism (11-15.9.95). Members of the project led a guided tour of the participants to locations of ecotouristic potential.
- Participation to the "International Birds Day"; the actions were prepared by the Hellenic Ornithological Society (e.g. birdwatching at lake Koronia).

Printed material

- *Posters*

  Two posters, one with general views of the lakes and an other on the rare and ecologically important riparian forest of Apollonia were produced (Appendix I) and widely distributed at the area.

- *Leaflets*

  Four leaflets on values and management problems of the wetland were issued (Appendix I). All of them were coloured, three-folded and had the logo: "Lakes Koronia and Volvi; invaluable treasures".

- *Panels*

  Two panels informing people about the values of the two lakes and the MedWet public awareness campaign were prepared in order to be presented at the International Fair of Thessaloniki (AGROTICA '95) on 1-5.2.1995.

The environmental education package "The Briefcase of the Lakes Koronia and Volvi".

A mobile environmental education kit, "the briefcase of the Lakes Koronia and Volvi", has been created and by the end of the project was ready to start its trip around the schools of the area. The kit was presented on 18.12.95, during the Closing Meeting of the project.

This educational tool uses mainly games and activities in order to explain basic ecological concepts. In this way, it enables the children to discover the given information by themselves. It covers a broad range of issues, such as limnological aspects, food webs, adaptation, vegetation types, human presence and activities, pollution etc. A frog called Coax, the logo of the package, introduces the children to the wonderful world of nature.

The kit is designed so as to be used by schoolchildren (ages from 6-14), with the teachers playing an introductory and steering role. It contains:

- A set of 20 games and activities, carefully designed and presented, which constitutes the main part of the package. "The game of the lakes", a table game, tries to handle the difficult issue of interrelationships: humans, animals and plants, work as a whole through their interactions. Human activities can trigger a chain of reactions, very frequently with unexpected results.

- A series of 37 slides with pictures of the wildlife of the two lakes, accompanied by a short explanatory text.
- An exhibition of pictures and texts on fifteen 30x40 cm boards, describing life in and around the lakes. The vegetation and fauna of the lakes, especially the birds, are presented, as well as the human activities around the lakes and the problems they cause.
- A tape with lake sounds accompanies all the visual material. Children are asked to listen and recognize the sounds (bird songs, water sounds) gaining deeper understanding of their surrounding nature.
- The games and activities are supported by a reference text which provides all the basic information for the lakes and their ecology, plus a set of detailed instructions on how to play each game or carry out each activity.

The creation of this "mobile" environmental activity package, is a result of the collaboration between various specialists in ecology and environmental education: T. Arapis, V. Hatzirvasanis and S. Faridis constituted the working team, with expertise provided by G. Blionis, E. Koutrakis and Maria Katsakiori (EKBY staff). The drawings were made by V. Hatzirvasanis. The game "Storks", was created by N. Kamtsios, a teacher of a local primary school, and describes the life of these birds.

Two replicas of the package have been prepared and will be distributed by EKBY to the Environmental Education (Primary and Secondary) offices, in order to be officially delivered to every school or environmental education project that would wish to use them.

Contacts

- Contact with the Ministry of Macedonia and Thrace. The Minister and the administrators were briefed on the main problems of the area and the purposes of the project.
- Contacts of the project staff with the target groups.
- Participation in the meeting held by the Local Union of Communities and Municipalities, where the draft Joint Ministerial Decision on the delineation and protection of the wetland of the two lakes was discussed (23.2.95).
- The re-operattion of the abandoned meteorological stations of the area, with the responsibility of the Irrigation Service of Central Macedonia Region, was officially requested.

- Meeting with the representative of the new sub-prefect of the Langadas Sub-Prefecture (the position of the sub-prefect was recently introduced in Greece), for the establishment of a basis for cooperation.
- Meeting with the new vice-prefect of the Thessaloniki Prefecture, who is responsible for environmental affairs. Both sides agreed to cooperate.
- Consultation was provided to Prefecture officials, in order to introduce regulations for the wise use of irrigation water of Lake Koronia. Furthermore, support was given to Local Authorities which were in favour of such initiatives. As a result, a new Prefecture regulation was finally issued on 12.4.95. (Appendix IV).
- Participation in the meeting held at the Thessaloniki Prefecture, on 9.6.95, for assessing the implementation of the Prefecture regulation for the wise use of irrigation water at Lake Koronia.
- Participation in the meetings of the Committee for the Environment, which was established by the Ministry of Macedonia and Thrace on 8.6.95.
- After the fish kills incidents of August 1995, new consultation was provided to Prefecture officials, in order to renew the Prefecture regulation issued on 12.4.95. (Appendix IV).

Press releases and publicity

Press releases were issued on every occasion of the various meetings, conferences, events and production of printed material was sent to journalists. The results are reported in the paragraph of the following chapter "Evaluation of media response" (J.3).

Closing Meeting

The Closing Meeting of the project was held on Monday 18.12.95, at the town of Langadas, near lake Koronia. The overview and the results of the project were presented, and three lectures were given on a) the hydrology and the water resources of the area, b) the future of fisheries in the two lakes, and c) the project's proposals for the development of ecotourism. The environmental education package "the suitcase of Koronia and Volvi" was also presented.

Irrigation was confirmed to consume the highest percentage of surface and ground water in comparison with the remaining human water-consuming activities. Dr Ch. Vatseris presented data from his PhD thesis (Vatseris 1992), which revealed that

about 80% of the total human consumption of the local water resources at the area of Langadas and lake Koronia, were being used for irrigation.

The lectures were followed by a heated discussion, with strong elements of critisism towards the slow pace at which protection measures were implemented. However, most participants praised the value of the project in sensitizing the wider public of the area. Proffessors from the Zoology Department of the Aristotle University of Thessaloniki, expressed their pessimism on the future of lake Koronia. Finally, village representatives asked from all participants to help in saving the two lakes and protested for the new irrigation networks that were planned in the area by civil services.

The overall performance of the communication campaign

The actions of the communication campaign are listed in Table 13, while the outputs of the project are presented in Appendix I. There were minor changes in comparison to the initial workplan (Table 12). The outdoor pannels were omitted due to the current preparation of outdoor pannels by another project carried out by the Greek Ministry of Environment. However, several actions were added to the ones mentioned in the project's proposal (EKBY 1994) or the project contract. The technical report and the leaflet on ecotourism, the co-organisation of local events like the seminar on ecotourism or the "International Birds Day" were additional EKBY's initiatives, which markedly strengthened the project, since they were supportive to the ideas and planning of local authorities.

Table 13. Actions performed during the communication campaign.

Action	Month	Year
Preparatory work	April-September	1994
Commencement Meeting	October	-"-
Government Inter-Service Technical Meeting	December	-"-
Production of general leaflet and poster	December	-"-
Participation in the International Fair of Thessaloniki (AGROTICA '95)	February	1995
Technical meeting on the wise management of irrigation water	March	-"-
Contacts with experts on Fisheries and Agriculture	April	-"-
Technical meetings on a) irrigation water, b) agrochemicals, c) fisheries	May	-"-
Elaboration of three technical reports on a), b) and c) above	May	-"-
Leaflet on the values and problems of the fish production	June	
Interim Meeting	June	-"-
Participation in the local festival, the "Day of Liparia".	July	-"-
Technical report on the potential for ecotourism of the area and proposals	August	-"-
Collaboration with "Anaptyxiaki S.A." for the performation of a seminar on ecotourism	September	-"-
Participation to the "International day of birds"	October	-"-
Leaflet on the problems of pollution and the reduction of water volume	November	-"-
Leaflet on sites of the area which are interest to ecotourism (short guide)	December	-"-
Closing Meeting	December	-"-
The environmental education package "the briefcase of Koronia and Volvi" (ready for use).	December	-"-

9. THE CONDITION OF THE LAKES DURING THE PROJECT.

The decrease of the lakes' water level has already been described (chapter 8, Technical Meetings). The data were cross checked and confirmed by the end of the project, when a paper was published by researchers of the Institute of Geological and Mining Exploration (IGME) (Papakonstantinou et al., 1995). Data for lake Koronia (Figure 8) were similar to the ones that we used in our technical reports.

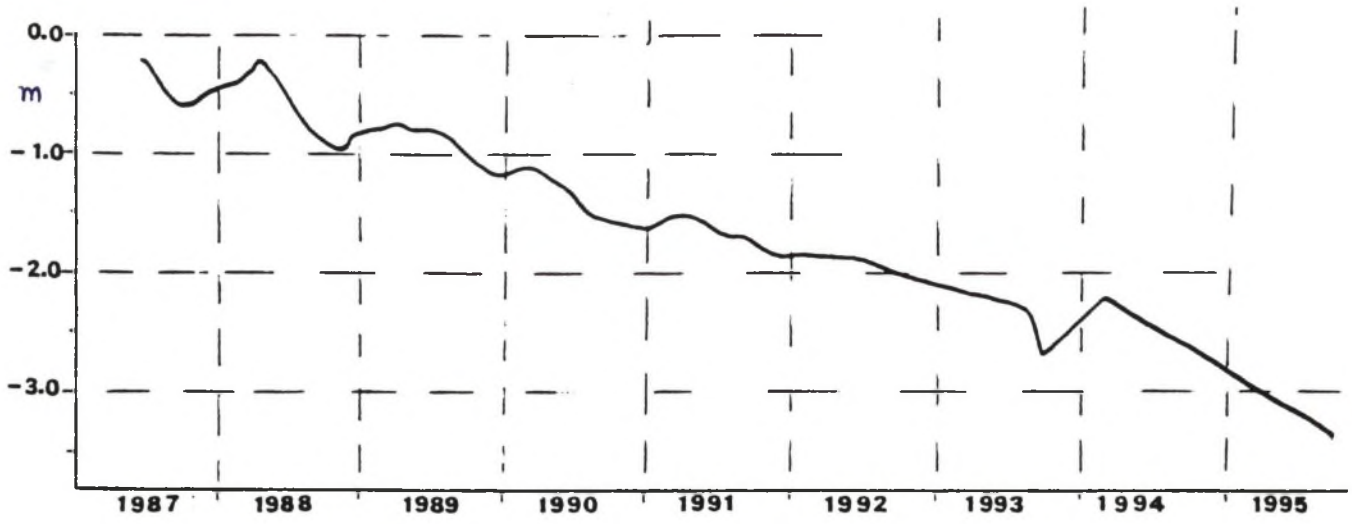


Figure 8. Fluctuation of lake Koronia's water level (Papakonstantinou et al. 1995), during 1987-1995.

The decrease continued in 1995. During summer, almost 30-40 cm were lost, reducing Koronia's mean depth to 1 m. Prefecture officials admitted that the irrigation water use restrictions decided in April, were not effectively implemented. Indeed, local farmers continued to freely pump water directly from the lake. Law enforcement was proved to be impossible due to functional problems and lack of personnel of local police stations.

Pollution by the various sources also remained unchanged. During two consequent weekends in early August, severe pollution incidents from unidentified industrial sources were reported. The increased pollution levels, further aggravated by the decreased water volume, caused massive fish kills occurred, leading the fish populations to extinction.

During September, before the updating of the Prefecture Decision, and after the fish kills, bird kills followed. Hundreds of ducks were found dead on the lake shore. The analysis of dead birds tissues, performed by Prof. Artopios of the Department of Veterinary of the Aristotle University of Thessaloniki, (30.10.95), did not identify pathogenic bacteria neither in the carcasses nor in the water samples. Thus Prof. Artopios postulated that "the bird paralyses and kills are basically due to the increased alkalinity of the water, which, in turn, is due to the high concentrations of ammonia or its product substances".

Indeed, pollutant concentrations in Koronia's waters were found to have reached extremely high levels. Papakonstantinou et al. (1995) found that during the last 3 years, pH rose from 8.9 to 10.7, while electrical conductivity doubled (Table 15). These semi-saline waters may well have attracted the beautiful Flamingoes in the first years, but they finally became toxic for fish and birdlife. It is moreover implicit that these waters are unsuitable for irrigation.

Table 15. Physical and chemical parameters of Lake Koronia's water (from Papakonstantinou et al., 1995).

Date	pH	Electrical conduct. $\mu s.cm^{-1}$	Na^+ mg/l	K^+ mg/l	CO_3^{--} mg/l	Cl^- mg/l	NO_3^- mg/l	NO_2^- mg/l	NH_4^+ mg/l	Oxidation ($KMnO_4$)	As mg/l
11-1992	8.9	2.600	497.7	11.0	48.0	425.4	3.7	0	0	1.8	56
10-1995	10.7	5.930	1210.0	70.0	1274.4	1418.4	11.9	0.003	2.1	10.2	50

Lake Volvi did not suffer from pollution problems. The electrical conductivity was estimated at about 1 $\mu s.cm^{-1}$, which is very good for irrigation use. However, local information was referring to water level decrease during summer, even if to a lesser degree than that of lake Koronia.

During the first months of 1996, Koronia's water level increased about 20 cm, due to increased rainfall.

10. MONITORING AND EVALUATION OF THE RESULTS

10.1. Contribution to the legal protection of the area as a result of the project's proposals and lobbying.

10.1.1. Contribution to the Joint Ministerial Decision (JMD)

EKBY staff participating in the project and the technical advisors, reviewed the first drafts of the JMD and the remarks made by civil services and Local Authorities and moreover provided expert opinions. The whole process of remarks by the local decision makers and the discussion through MedWet meetings, resulted in a thorough elaboration of the JMD, which is hoped to be welcomed by the local people and wetland users. An outline of the permitted activities per protection zone as outlined in the JMD, can be viewed in Appendix II.

10.1.2. Prefecture Decisions Restricting Water Use

Together with local civil services, the project team proposed to the Prefecture of Thessaloniki restrictions in the use of lake Koronia's water for irrigation. The Prefecture approved the proposals and issued a decision on 12.4.95, including measures that can be seen in Appendix III. However, the situation of the lake deteriorated during summer 1995 (see also paragraph J.2) and the Prefecture was forced to issue an updated decision on 6.9.95 (also presented at Appendix III). These decisions were a really important step for the legal protection of the two lakes and the project excercised a strong lobbying pressure for the enforcement of the decisions.

10.1.3. Prohibition of grazing and hunting near the lakes

The project supported the proposals of the village council of Apollonia on the grazing prohibition around the coastline of the lakes, because the project team was convinced that grazing is in fact inhibiting riparian forest regeneration. The proposals were finally approved by the Prefecture Committee for the Environment, on 4.12.95.

The project also supported the hunting prohibition for the period 1993-1996, and proposed its continuation.

10.1.4. The future Management Plan and the Presidential Decree

The technical reports and proposals of the project will be included in the baseline material for the elaboration of the area's Management Plan. By the time that this Plan will be ready (in 1998), it will be the main reference for the issue of the Presidential Decree which will be a powerful instrument to the legal protection of the wetland.

10.2. Evaluation of media response.

There were 77 publications in national and local (Thessaloniki) daily newspapers, throughout the project. Only 14 of them were published in 1994. The number of publications concerning each action of the project is seen Figure 9, while the total length of these publications in Figure 10.

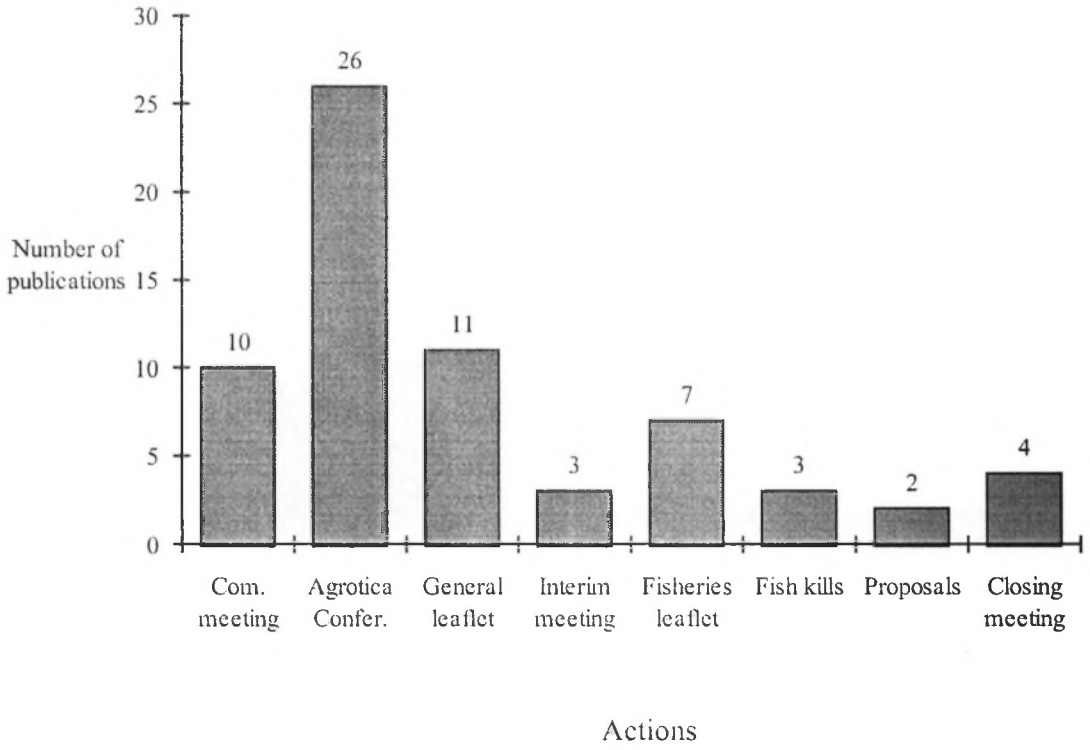


Figure 9. Number of press publications for press releases disseminated by the project.

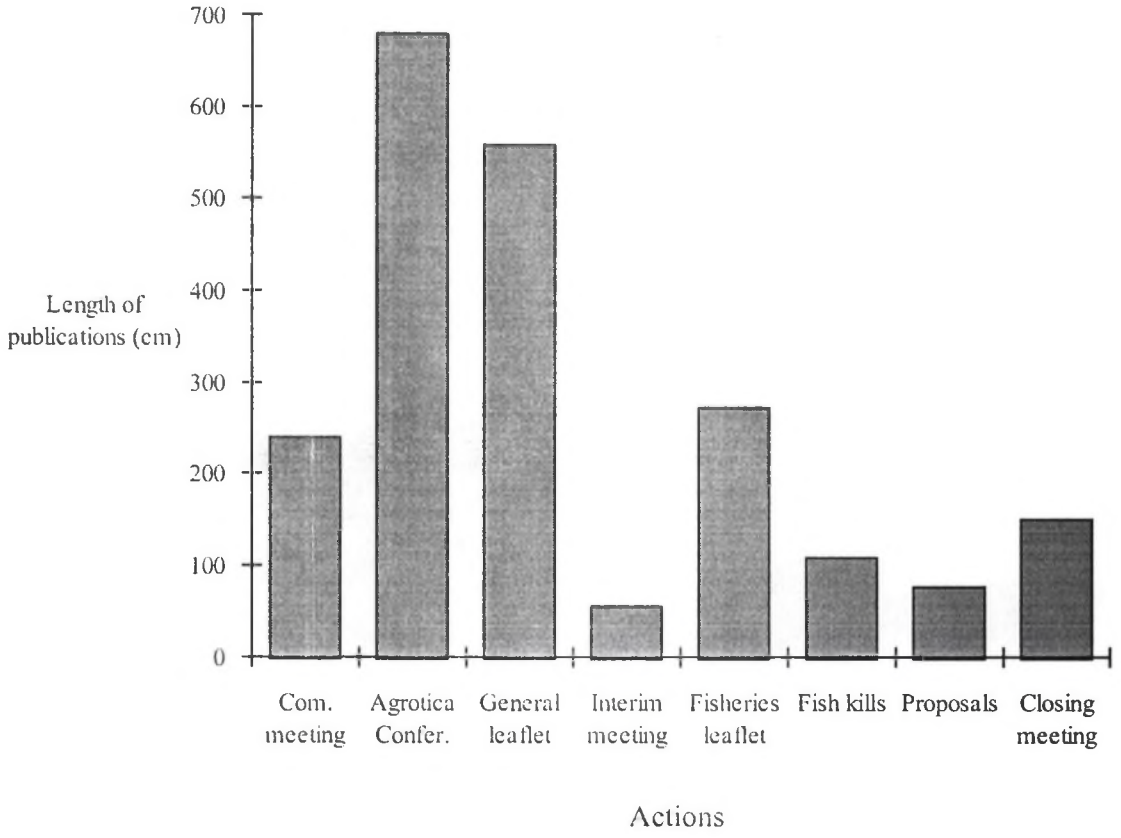


Figure 10. Length of press publications for press releases disseminated by the project.

Ten newspaper articles, as well as a three-page report in the official journal of the Geotechnical Chamber of Greece, covered the Commencement Meeting. Nine interviews on the issues of the meeting as well as the whole project were given to five newspapers, two TV stations and two weekly magazines.

The main bulk of publications appeared in 1995. There were 26 articles about the participation of the project in the International fair for Agriculture (AGROTICA '95) and the orgainisation of the Conference "Lakes Volvi and Koronia: Biological Research and Information". Seven interviews were given to newspapers, three to TV stations and two to radio stations. The first general leaflet and poster which were distributed to journalists, provoked a strong interest. Eleven articles used information or published entire paragraphs and pictures. A journalist (Mr Kaitatzis) and a photographer from "Eleftherotypia", one of the most popular national newspapers, were briefed and guided in the area of the two lakes for one week. A series of three articles was published in the central pages of that newspaper, as a

result of this guided tour. The above mentioned publicity, contributed to the introduction of the problems of the two lakes to the National and European Parliament, by Greek MPs, in spring 1995.

The Interim Meeting did not receive too much attention by the media (3 articles), possibly because it was held at Nea Madytos, a village almost 50 km from Thessaloniki. In contrast, the leaflet on fisheries which was sent to journalists was mentioned or used in 7 long articles.

Following the fish and bird kills at Koronia, in August and September 1995, some publicity was given to the opinions of the project (3 publications, 1 TV interview, 1 weekly magazine interview) and the new proposals of EKBY about wiser water management in the area (2 publications, 1 radio interview, and a two-pages report in the magazine of the Geotechnical Chamber of Greece). Finally, a live interview in a TV program of ET-3 (the third channel of Greek State Television, which is stationed in Thessaloniki), on 22.11.95, presented the subjects that would be disscussed at the project's Closing Meeting. However, the Meeting itself did not receive much attention (3 publications, 1 radio interview), possibly for the same reason as the Interim Meeting: the distance from Thessaloniki which discourages journalists from attending the event.

The above analysis of publicity, shows that the project received a high degree of response from the mass media. We are sure that this had a strong impact to the decision makers as well as the local and wider public, which realised the threats that these valuable ecosystems are facing. The first actions of the project received wide attention, with a peak in February 1995, when the Conference on the two lakes was organised and the first printed material was disseminated. After summer however, the attention of the media decreased due to the increased publicity of the fish and bird kills (which caused an overflow of bad news), and to the location and time of performance of the main events (distance from Thessaloniki, summer or Christmas holidays).

10.3. Review of attitude changes of the target groups

10.3.1. Decision makers.

Most of the attitude changes were noticed in high ranking officials of the Prefecture of Thessaloniki. Their reactions were faster and more favourable towards

environmental conservation, than before the project. However, the problem of weak implementation of the new regulations was not overcome due to resistance by local interests. In addition, there were some problems in persuading land reclamation and industry services to adopt a more integrated view of their activities. We believe, nevertheless, that a fruitful dialogue has started.

Local authorities were less willing to participate in conservation discussions. The most willing of them were the Chairmen of Village Councils of Agios Vassilios, Apollonia and Nea Madytos. We must note that these villages are considered as central for the conservation efforts in the whole area. Agios Vasilios is the only village on Lake Koronia's shore and all the fishermen of this lake are residents of this village. Apollonia is next to the riparian forest with the same name while Nea Madytos is the base of the "Development Association of Lake Volvi area's Communities". The project team were in close collaboration with these three very active and sensitive individuals and we believe that they should be included as representatives of all the others in future environmental programmes or decisions, as far as environmental issues are concerned.

We must add however, that there was a good response to the project from other villages too, e.g. Mikri Volvi and Peristeronas. Despite the low local interest, the project has provided all Local Authorities with material which is considered as most valuable for the conservation and sustainable development of their area and we believe that this will serve as a motivation for more sustainable actions in the future.

The improved circulation of information among services and other relevent bodies, as well as their advanced collaboration on environmental issues, are considered to be among the most valuable results of the whole project.

10.3.2. Fishermen.

The fishermen of the area became more trustful and collaborative towards scientists and scientific institutes, and improved collaboration was established. However, the fish kills in lake Koronia, left Koronia's fishermen practically unemployed. Efforts to employ Koronia's fishermen in lake Volvi were made by both the Fishing Inspectorate and the project. These efforts were welcome by the fishermen of Lake Volvi, but until the preparation of this report there was no progress.

10.3.3. Farmers.

Farmers were the most difficult target group. Their representatives were contacted with difficulty. The majority prefer an increased production and income rather than the long term wellfare of the two lakes, which involves restrictions upon their activities. The project tried to convince them that better environmental conservation ensures the agricultural production of the future, through leaflets, conferences and press releases. However, we did not notice any tangible change of attitudes, probably because any restriction must be accompanied by a parallel effort of supporting the income in this relatively poor agricultural area of Greece.

10.3.4. Schoolchildren.

We have not yet been in a position to testify the impact of the project to this target group, since the environmental education package that was prepared has not yet been executed by local schools. However, we are sure that the long term impact will be a most important result of this project.

The above mentioned package is the first ever made for the particular area, and one of the limited number of similar packages which are now available in Greece. There is already a lot of interest by schools and teachers to use it and most imposrtant of all, civil servants which are responsible for the Environmental Education in the Prefecture of Thessaloniki were found to be very eager to encourage the use of the package.

10.3.5. Wider public.

Before the implementation of the project's communication campaign, the Ramsar site of lakes Koronia and Volvi was one of the most neglected such sites of Greece. The project, made the values and the problems of this wetland very widely known. Scientific institutes, environmental organisations, members of the Greek and European parliament and many more bodies and individuals were informed and contributed in their own special way supporting the environmental conservation efforts that are under way at the area. Now it is a common belief that Lake Koronia is probably the most endangered wetland in Greece and actions are anticipated by all levels of government. The project's proposals have shown to people that major changes in management and land use are needed, something that could represent an example of future sustainable management for other areas of Greece.

10.4. Evaluation of tools used in the realisation of the communication campaign

Meetings/Conference

The three main Meetings (Commencement, Interim and Closing) as well as the meeting in which the draft Joint Ministerial Decision was presented were succesful in gathering most of the decision makers (i.e. civil servants and the most important of the Local Authorities). The result was a better circulation of information among them as well as a better coordination.

The technical meetings provided useful information for the current situation of various human activities practiced in the area as well as ideas for a wiser use of the areas' resources. All these were included in the technical reports which were prepared for the relevant subjects and were presented in the meetings.

The Conference on the biological research and information on lakes Koronia and Volvi presented most of the available scientific material concerning the biotic environment of the area. It document the critical situation and the need for immediate actions.

Participation in Agrotica '95

The stand of EKBY in the International Fair for Agricultural Products, in which there was material presenting the project, attracted many visitors and was an excellent means for contacting farmers and passing the message of mutually beneficial co-existance of agriculture and the wetlands.

Printed material

The leaflets and posters produced by the project went a step further than a simple presentation of facts. They introduced the multiple values of the wetlands of the two lakes, they provided reliable scientific information on difficult management problems in a simplified way and gave a new perspective for the future of the area through the proposals they contained. They were especially appreciated by Local Authorities (special thanks were expressed by the sub-prefect of Langadas for all the set of publications and the Community of Apollonia for the poster on the riparian forest, a number of which were provided to the Community for distributing them to visitors) and according to them, the material helped their efforts for environmental

conservation. The material was also used by newspapers and magazines in articles and special publications, even in cases which did not relate to the project itself.

Technical assistance

The technical reports produced, provided technical assistance for the new Prefecture regulations which were introduced. Prefecture officials continue on asking expert opinions by EKBY on related issues, since they appreciated the cooperation and actions of the project. We believe that the technical reports will be useful in other future actions by Local Authorities or even NGOs as well.

Technical assistance and advice was provided to the Fishermen Associations, too. Fishermen were proved to be more willing to listen and accept the project's proposals for conservation issues.

Lobbying

The lobbying efforts of the project were focused on the adoption of the technical proposals by Local Authorities, which proved to be successful as far as the irrigation water management is concerned. However, the implementation of the regulations at the area was proved to be difficult if not impossible, despite our notices.

Press releases

The impact from the press releases of the project was significant since the publicity created great interest for an area almost neglected by the mass media until now. The main problems of the lakes were introduced in the Greek and European Parliaments, while environmental NGOs used the project's releases and results in their lobbying activities.

"The Briefcase of the Lakes Koronia and Volvi"

It is expected to have major impact to the teachers and the schoolchildren of the area, since no similar education material is currently available to them.

Personal contacts

They helped in the creation of mutual trust relationships and of a renewed interest for the environmental values and ecodevelopment possibilities of the area.

Local events

They showed the wide range of cooperation that can be established with the environment being the common thread. Fishermen, Local Authorities and Associations, NGOs, scientists can form the network that will support a future management body for the conservation of the two lakes.

Guided tours

They proved the potential for ecotourism of the area, which could be a starting point for a sustainable development of the area.

11. CONCLUSIONS

The area of the lakes Koronia and Volvi is a site of international ecological importance, which faces severe problems, especially in its western side. MedWet's Information and Public Awareness pilot project for the particular area made the values and problems of the two lakes widely known through meetings, conferences, press releases, leaflets and posters. It also promoted the cooperation and information among public administrators and Local Authorities, received their opinions, studied the management problems, provided technical expertise, supported the issuing of new regulations and the drafting of the Joint Ministerial Decision, and promoted the support of these by the local people. It produced an integrated environmental education package for the schools of the area and tried to increase the awareness of fishermen, farmers, small industry owners and generally all people living in this ecollogically sensitive area.

It is believed that the project put the first cornerstones for the building of an integrated conservation scheme and illustrated the need for changes in economic activities so that they will be harmless to the environment and to humans. Similar projects have been conducted in other parts of Greece in the past, with a variable degree of success. The main factors which may have contributed to the comparatively greater success of this project were:

a) Experience from the previous projects of others (e.g. WWF-Greece)
b) The method and approaches developed by MedWet Public Awareness and Information sub-action, especially with regard to the planning stage
c) The idea of the officials from the Ministry of Environment (Section for the Management of Natural Environment) to place emphasis in developing to the highest degree the exchange of views, the positive interactions and the cooperation of the many civil servants involved in the management of the area
d) The infrastructure of EKBY and its ability to motivate and coordinate concerted actions.

The Closing Meeting showed that such projects consist a prerequisite for the protection of any ecologically important area and should be realised before any conservation action or regulation is implemented, in order to gain acceptance, support, cooperation and feedback by local inhabitants, authorities and every relevant body.

Although the project delivered more than it was planned and achieved results not only in raising public awareness but also in motivating specific conservation measures, the arresting of the deterioration of the lakes will need a far stronger and longer effort.

REFERENCES

Artopios, E.B. 1995. Official answer to a letter request by the Forestry Service of Langadas, concerning the causes of the bird kills at lake Koronia (30.10.95).

Blionis, G. 1995. Technical report on the ecotouristic potential of the area of Lakes Koronia and Volvi. MedWet. EKBY. Thessaloniki. 7 p. (Gr)

Blionis, G. and S. Hatziyiannakis. 1995. Technical report on the problems and management of irrigation water, in the area of Lakes Koronia and Volvi. MedWet. EKBY. Thessaloniki. 5 p. (Gr)

Dugan, P.J. (ed.). 1990. Wetland conservation: A review of current issues and required actions. IUCN - World Conservation Union Publication, Gland, Switzerland. 96 p.

EKBY. 1994. Raising Public Awareness And Information With Regard To Lakes Koronia And Volvi (Macedonia, Greece). MedWet project proposal. March 1994. Thessaloniki. 10 p.

Finistauri, N. (ed.). 1995. Application of Information and Public Awareness to test sites. Methodological guide. MedWet. WWF-Italia. 36 p.

Finlayson, C.M., G.E. Hollis and T.J. Davis. 1992. Managing Mediterranean wetlands and their birds. Proc. Symp., Grado, Italy, 1991. IWRB Spec. Publ. No 20. Slimbridge, UK. 285 p.

Hellenic Ornithological Society. 1994. Important bird areas of Greece. An introduction to the important Greek biotopes. Special Edition. Athens. 272 p. (Gr)

Hollis, G.E. and T.A. Jones. 1992. Europe and the Mediterranean Basin. In: Wetlands (Finlayson, C.M. and M. Moser, eds.). Slimbridge.

Jones, T.A. and J.M.R. Hughes. 1992. Wetland Inventories and Wetland Loss Studies - a European Perspective. Paper presented at XXXV IWRB Executive Board Meeting, St. Petersburg, Florida in November 1991.

Liponis, G. and G. Blionis. 1995. Technical report on the problems and management of agrochemicals, in the area of Lakes Koronia and Volvi. MedWet. EKBY. Thessaloniki. 5 p. (Gr)

Oikonomidis, G. 1995. Technical report on the problems and management of fisheries, in Lakes Koronia and Volvi. MedWet. EKBY. Thessaloniki. 7 p. (Gr)

Papakonstantinou, A., K. Katirtzoglu, I. Grigoriadis, and G. Katsanopoulos. 1995. Toxic substances impacts on the ecosystem of a hydraulic degrading lake: the case of lake Koronia, Perfecture of Thessaloniki. In the Proceedings of the 9th Seminar on Environmental Conservation. Laboratory of Environmental Pollution Control. Aristotle University of Thessaloniki (27-31 November, 1995). p. 167-174.

Pavlidis, G., B. Goutner, Marilena Zarftzian, I. Diamantopoulos, P. Tzortzi, D. Kokkas and Ch. Eminoglou. 1986. Programme for the delineation of Ramsar wetlands: Lakes Volvi and Langada. IPEHODE. 105 p.

Prefectural Division for Water Resources Management and Land Reclamation. 1995. Official answer (09/9843) to a request by Sub-Prefecture of Langadas (1-11-95).

Psilovikos, A. 1977. Palaeogeographic development of the basin and the lake of Mygdonia (Langada-Volvi area) Greece. PhD thesis. Aristotle University of Thessaloniki. 156 p.

Psilovikos, A. 1992. Changes in Greek wetlands during the 20th century: the cases of the Macedonian inland waters and of the river deltas of the Aegean and Ionian

coasts. In "Conservation and management of Greek wetlands" (Gerakis P.A., ed.). Proceedings of a Greek Wetlands Workshop held in Thessaloniki, Greece. IUCN. p. 175-196

Ramsar Bureau. 1992. Report of the working group on criteria and wise use (rev.). Gland, Switzerland.

Sekliziotis, S. and A. Papakonstantinou. 1992. Study of delineation and management of lakes Koronia and Volvi wetland. Final Report to IPEHODE. 339p.

Valoukas, B. (in press). Biology and Population Dynamics of Bream (*Abramis brama* L.) in Lake Volvi. PhD Thesis. Department of Biology. Aristotle University of Thessaloniki.

Vatseris, Ch. 1992. Hydrogeologie des Mygdonias-Beckens (Nord-Griechenland) under Beruecksichtigung der hydrochemischen und isotopen physikalischen komposition der Thermalwasser. Dissertation. Muenster Universitaet. 171 p.

Zarkanellas, A.I. 1989. Environmental study of the Lake Agiou Vasiliou. In the Proceedings of the 6th Seminar on Environmental Conservation. Laboratory of Environmental Pollution Control. Aristotle University of Thessaloniki. p. 32-41.

APPENDIX I

The project's outputs

Reports

Apart from seven bimonthly activity reports and three progress reports, which were submitted to the Information and Public Awareness sub-project coordinators, four technical reports were prepared on:

a) use of irrigation water,
b) use of agrochemicals,
c) fishery management
d) ecotourism

These reports were produced on the basis of the data, views and opinions which resulted from the technical meetings and additional bibliographical research (the report on ecotourism was based on a survey of the area, bibliographical data and the proposals of the Langadas sub-Prefecture). The proposals of these reports are presented briefly in Appendix II.

Minutes of meetings

After the main Meetings of the project (namely Commencement, Interim and Closing Meeting), the main points of the presentations as well as the discussion, were formulated in brief reports, which are available in Greek. There are also samples of the material distributed to the participants of these three Meetings: presentation abstracts, project's proposals, leaflets and posters enclosed in recycled paper files.

Leaflets

All the leaflets issued concerned the values and the management problems of the particular area, with an additional effort to propose sustainable approaches:

1. General leaflet on the values and problems of the two lakes.
2. Leaflet on the values and problems of the fishery management of the two lakes.
3. Leaflet on the problems of pollution and the reduction of water volume of the two lakes, with proposals for reversing the current course of degradation.
4. Leaflet on sites of interest for ecotourists in the greater area of the lakes, in the form of a short guide, which is aiming at encouraging ecotourism.

Posters

1. Poster with general views of the lakes, promoting the idea of harmonious co-existence between humans and wildlife
2. Poster on the rare and ecologically important riparian forest of Apollonia.

Other material

- For the purposes of the Conference "Volvi and Koronia: Biological Research and Information", a poster and a leaflet were produced and distributed. The minutes of the Conference are also available.

- Two indoor panels informing on the values of the two lakes and the MedWet public awareness campaign were prepared and presented at the International Fair of Thessaloniki (AGROTICA '95) on 1-5.2.1995.

APPENDIX II

Technical proposals which resulted from the technical meetings

1. Use of irrigation water

1.1. Short-term measures

- Enforcement of the regulations of the Prefecture Decisions and more effective wardening of the lakes
- Extention of the restrictions on irrigation water use
- Definition of the lower permitted water surface level of the two lakes
- Cancelation of construction of more irrigation networks
- Prohibition of use of water from anti-erosion dams for irrigation

1.2 Long term measures

- Readjustment in the pattern of crop farming
- Economic support to farmers who lose income due to implementation of the restrictions
- Establishment of a full network of meteorological and hydrological stations
- Modification of laws concerning fines for illegal irrigation drillings and illegal extention of fields in wetland areas
- Information and training of farmers on the wiser use of irrigation water
- Construction of lagoons for additional biological treatment of industrial wastes, urban sewage, and agricultural runoffs, by the use of aquatic plants
- Restoration of natural vegetation in the illegaly cultivated wetland areas
- Implementation of water recycling projects by the local industrial plants

2. Use of agrochemicals

- Initiation of soil analyses (free of charge), to be executed by the Soils Institute (which must be specially funded for this reason by the government) and establishment of compulsory soil analyses for land plots bigger than a determined limit.
- Execution of soil research at the area and delineation of homogeneous soil zones.
- Definition of the types and quantities of fertilisers that farmers ought to use, for the main crops of the area.

- Establishment of an archive about fertiliser types and quantities that are being used (at the Soils Institute).
- Production of information leaflets with instructions for fertiliser application and efficient use of irrigation water, and distribution of these leaflets to farmers.
- Investigation of the possibility of replacing the present irrigation systems with others which use water more efficiently.
- Incentives for organic farming must be provided.
- Provision of subsidies to crops that need minimum use of pesticides, fertilisers or water.
- Provision of subsidies for suitable crop rotations, encouragement of set-aside measures and agroforestry.
- Execution of research projects on the possibilities of the Regulation 2078/92 of EU, and its possible implementation at the lakes' basin.
- Planning of cultivation zones, including zones of integrated farming.

3. Fishery management

- Establishment of a special fund, into which the fishing taxes from the two lakes will be directed.
- Delegation of Prefecture responsibilities concerning fishing issues, to the Fishing Inspectorate of Thessaloniki.
- Securing the necessary personnel and equipment for more effective wardening of the lakes.
- Improvement of law 2040/92 concerning issues of penalties and fines for illegal fishing.
- Training of local fishermen
- Fish stocking projects with predetermined timetable.
- Scientific support (consultation, research) to enable the Fishing Inspectorate to produce sound recommendations and documented proposals to the Ministry of Agriculture
- Enhancement of professionalism of local fishermen.

4. Ecotourism

- Creation of two more centres for environmental information (Langadas, Ag. Vassilios)

- Restoration of monuments as well as construction and operation of visitor facilities (Ag. Vassilios, Mikri Volvi, Rendina)
- Construction of birdwatching facilities (Scholari, Apollonia)
- Protection of the geological formation of Nymfopetra as well as construction and operation of visitor facilities
- Promotion of the amateur fishing in Mikri Volvi
- Protection of the riparian forests of Apollonia and Redina as well as construction and operation of visitor facilities
- Construction of facilities for windsurfers at Volvi in an ecologically acceptable distance from the shore
- Construction of footpaths for ecotourists through the riparian forests of Redina and Melissourgos
- Creation of proper routes for cyclists around the lakes. Motorcycles must be excluded.

APPENDIX III

Outline of the permitted activities per each protected zone, in the draft Joint Ministerial Decision (JMD) for lakes Koronia and Volvi

The JMD will set the boundaries of the wetland and will define the permitted human activities within each zone, incorporating the comments and views expressed on the draft version by the bodies involved. After its valid period of two years, a permanent Presidential Decree will be issued by the State.

ZONE	ACTIVITIES
Zone A: High or Absolute Protection Water surface, shores, marshes, seasonally flooded areas, streams and torrents, riparian vegetation, some forests and cropland. Zone A includes the Nuclei of Absolute Protection ⇓	**Permitted under sustainable conditions** 1. scientific research 2. visits for environmental education, contemplation of nature & mild recreation 3. circulation of vehicles on existing roads 4. restoration, rehabilitation and conservation projects, reedbed management 5. historic/archaeological sites protection projects 6. grazing of cattle and sheep, away from areas of riparian vegetation & reedbeds 7. fishing, fish farms 8. moorings & circulation of small fishing boats 9. crop farming, in the existing legally farmed lands. Organic farming is pursued 10. forest management projects 11. operation & maintenance of legal irrigation & drainage networks 12. disposal of sewage after secondary treatment
Zone A: Nuclei of Absolute Protection Nesting, roosting and feeding sites of protected and endangered bird species	**Permitted under sustainable conditions** scientific research, projects for the improvement of ecological characteristics existing illegal constructions and activities will be removed
Zone B: Peripheral Protection Zone Forests, range and cropland, torrents, human settlements Surrounds Zone A	**Permitted under sustainable conditions** 1,2,4,5,6,9,10,11 as in Zone A Projects for the improvement, restoration, maintenance and modernisation of sewage disposal systems, drinking water supply, railroads & other infrastructure, after approved Environmental Impact Assessment (EIA). Apiculture, controlled crop/fish farming and light industry development, controlled housing
Zone C: Protection of the wider area The Mygdonian basin	**Prohibited** Installation/operation of nuclear power plants or heavy industries Circumstantial landfilling, installation of landfill site for big towns Mining activities with front visible from Zones A & B Installation/operation of new light industrial units up to 200 m from either side of streams & torrents which discharge into Zone A Forest management projects detrimental to the wetland conservation Other development projects, after approved EIA

APPENDIX IV

Prefecture decisions introducing restrictions to irrigation water use at he area of lake koronia

The decision issued on 12.4.95, contained the following measures:

1. Measures for the protection of water quantity

The Decision prohibits:

1.1. The direct removal of water from the lake. The existing legal irrigation networks of the villages Evangelismos and Vasiloudi are exempted, but must reduce the quantity pumped out by 20% each year.

1.2. Groundwater drilling at a radius of 300m from the perimetre of the lake

1.3. The cultivation of the areas exposed by the dropping of water level. Moreover the efforts for wise use of water, fertilisers and pesticides must be intensified, and the procedures for the conversion from irrigated to non-irrigated crops must be accelerated, through the implementation of the Directive 2078/92/EEC.

Fines will be imposed to the offenders.

2. Measures for the protection of water quality

2.1. Intensifiation of the control exercised over the polluting units of the area, with particular emphasis on the ones discharging their effluents to the lake.

2.2. Heavy fines (up to 10 million drachmas) will be imposed to the polluting units.

2.3. In case of repeated offense, the operation permit of the unit will be temporarily or permanently removed.

2.4. An effluent treatment and disposal study must be submitted from the illegaly operating units within 15 days. If the treatment plant is not constructed in a minimum time limit, their operation will be ceased.

2.5. The units which possess a temporary (6 months) disposal permit or have modified their approved plan, are obliged to produce and conform to an urgent infrastructure construction plan.

2.6. Heavy fines (up to 10 million drachmas) will be imposed to individuals or companies who act against the above and whose activities cause the degradation of the lake.

The decision issued on 6.9.95, contained the following measures:

1. Funding for the removal of the dead fish.
2. Amendments to the prefecture decision issued on 12.4.95:
   - Extension of the drilling-free zone to 500m from the perimetre of the lake
   - Immediate stopping the operation of the irrigation network of Vasiloudi, after the recent grounwater drilling
   - Investigation of the possibility to stop the operation of the network of Evangelismos, in association with i. a survey for alternative water source and ii. funding for the conversion from irrigated to non-irrigated crops
   - Continuation of the polluters' control and production of monthly reports, including the proposal of further measures.
   - Increase of the fines for the individuals who cultivate the exposed areas until this offense is completely eliminated.
   - Acceleration of the procedures required for the installation and operation of the Sewage Treatment Plant of the town of Langadas.
   - Immediate issuing of the JMD
   - Acceleration of the procedures for the implementation of the regulation 2078/92/EEC

Long-term measures:

1. Recharge of the lake and the surrounding aquifer with water. Preparation of a study which will propose and budget specific solutions
2. Readjustment in the pattern of crop farming in association to the above mentioned EEC Directive.
4. Revision of the local policy on the industrial development of the area.

The Prefecture was advised by a special Committee to form a service to inspect pollution for a 24 hours a day and 7 days a week. In addition, the Committee strongly suggested a conservation-friendly ecotouristic development plan for the wider area of both lakes to be put into operation, thus creating new opportunities for employment and increasing the environmental awareness.

APPENDIX V

Games and drawings used in the Environmental Education Package "The suitcase for Volvi and Koronia"

The Environmental Education package prepared by the project contains mainly games and activities in order to explain basic ecological concepts. A frog called Coax, the logo of the package, introduces the children to the wonderful world of nature. Below are some examples from the games and drawings of the package:

- "find the small animals of the lakes",
- "find which fish do not match",
- "paint a bird lunch",
- "which beak and which leg",
- "help them eat and return to their nest",
- "every plant at its place",
- "every animal at its place",
- "a food pyramid",
- "discover the hidden litter",
- "fields for irrigation",
- "the game of the lakes" (a table game which tries to handle the difficult issue of interactions).

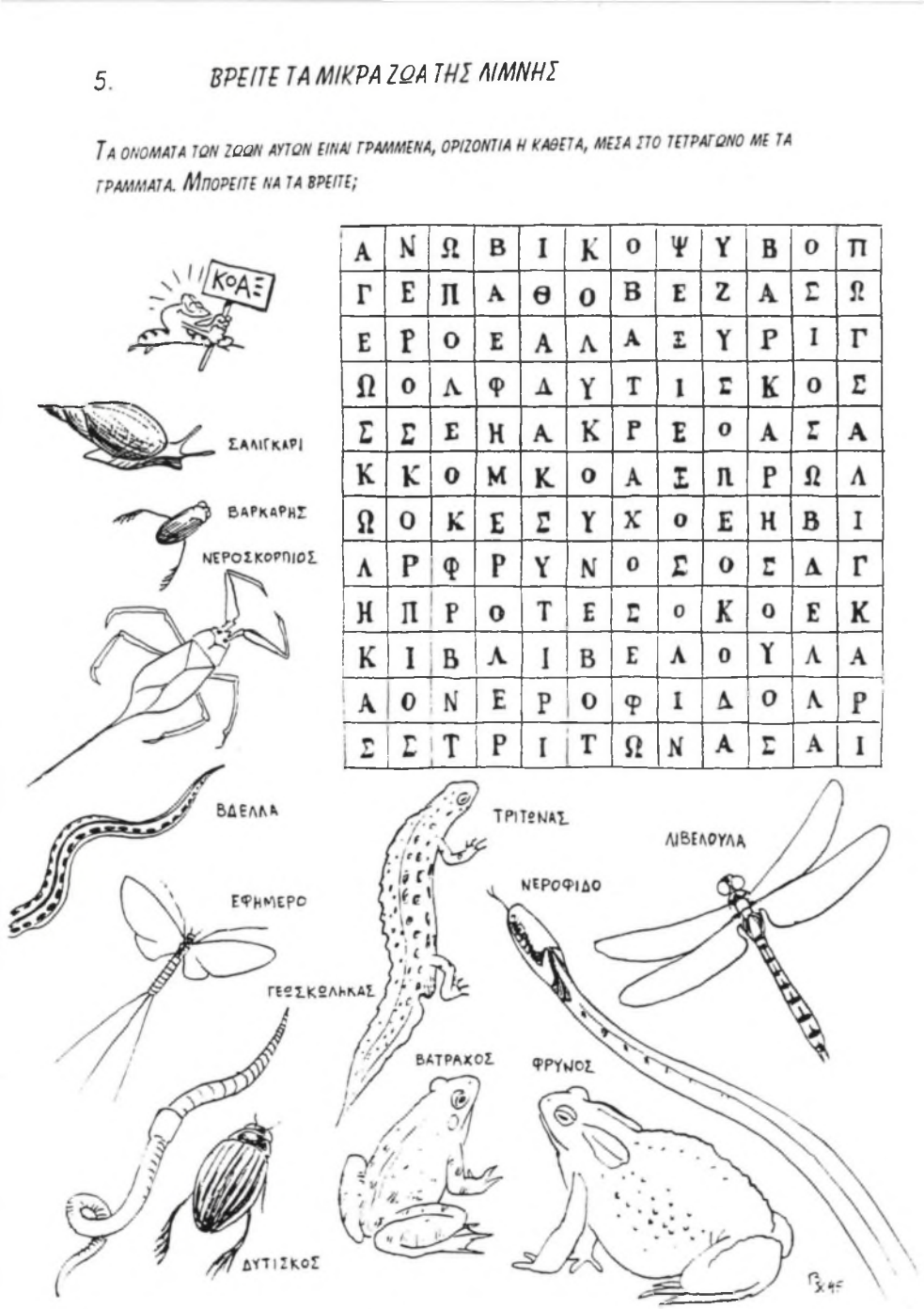
The games and activities are supported by a reference text which provides all the basic information for the lakes and their ecology, plus a set of detailed instructions on how to play each game or carry out each activity.

All the drawings were created by V. Hatzirvasanis.

5. ΒΡΕΙΤΕ ΤΑ ΜΙΚΡΑ ΖΩΑ ΤΗΣ ΛΙΜΝΗΣ

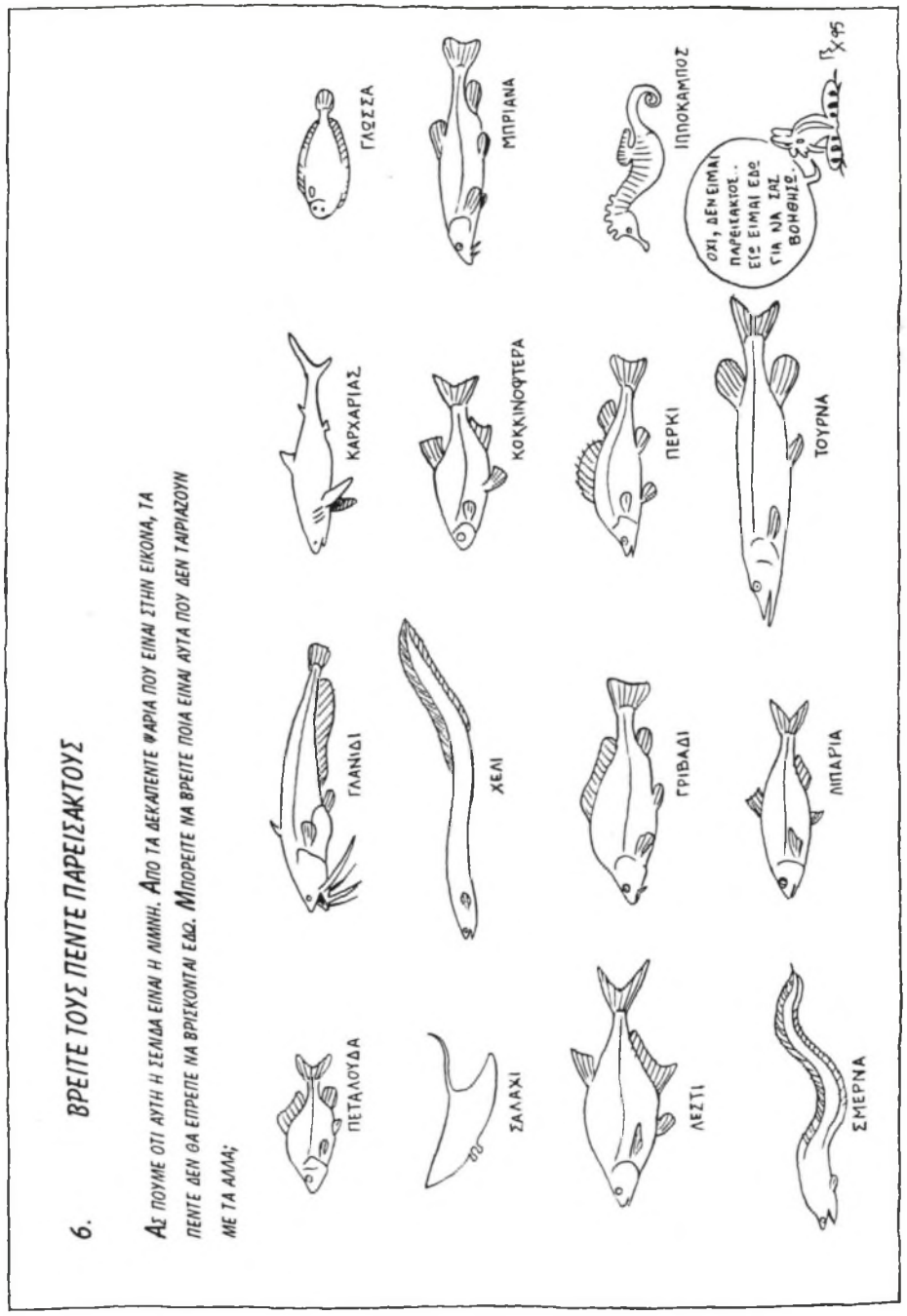
Τα ονοματα των ζωων αυτων ειναι γραμμενα, οριζοντια η καθετα, μεσα στο τετραγωνο με τα γραμματα. Μπορειτε να τα βρειτε;

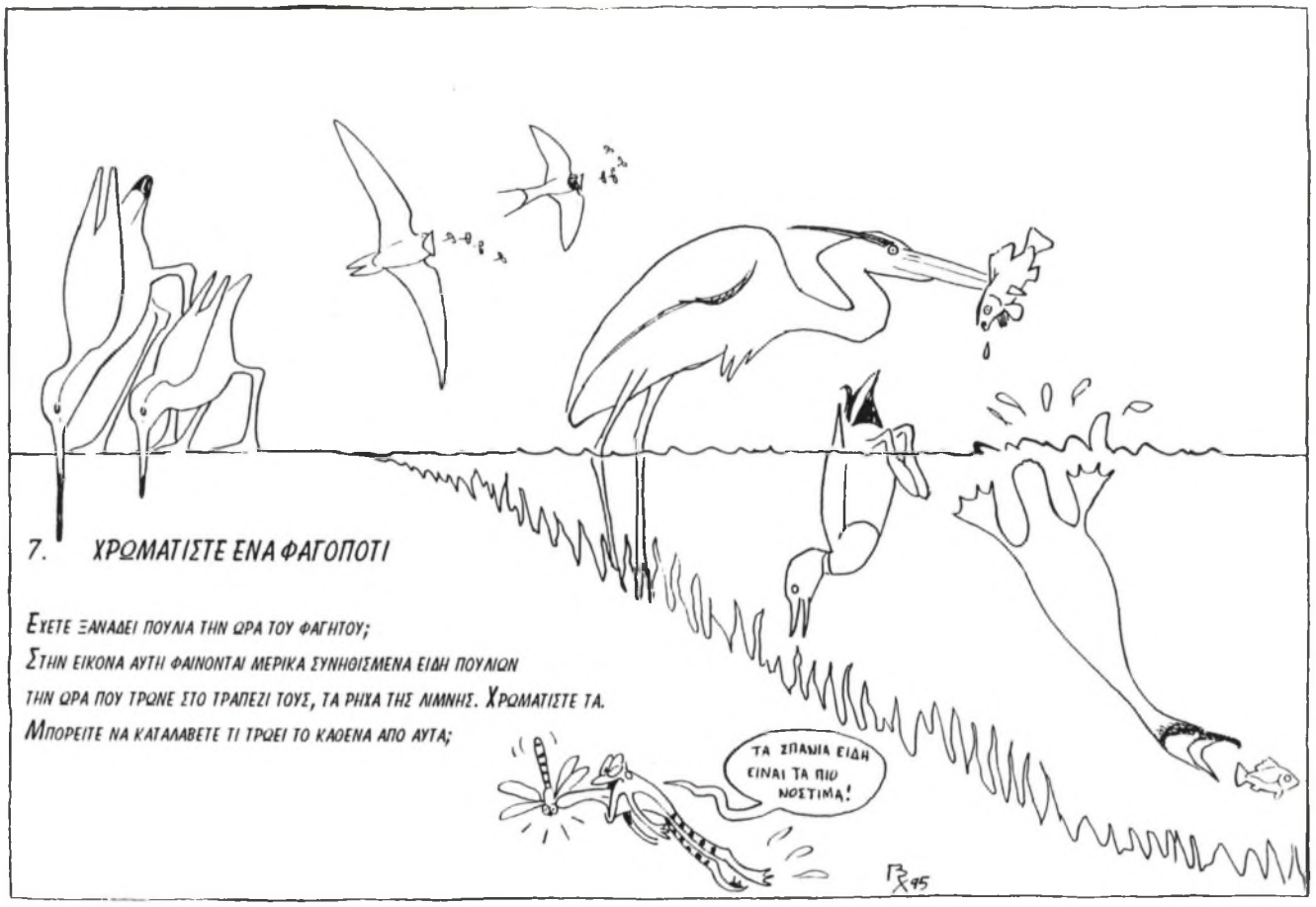
Α	Ν	Ω	Β	Ι	Κ	Ο	Ψ	Υ	Β	Ο	Π
Γ	Ε	Π	Α	Θ	Ο	Β	Ε	Ζ	Α	Σ	Ω
Ε	Ρ	Ο	Ε	Α	Λ	Α	Ξ	Υ	Ρ	Ι	Γ
Ω	Ο	Λ	Φ	Δ	Υ	Τ	Ι	Σ	Κ	Ο	Σ
Σ	Σ	Ε	Η	Α	Κ	Ρ	Ε	Ο	Α	Σ	Α
Κ	Κ	Ο	Μ	Κ	Ο	Α	Ξ	Π	Ρ	Ω	Λ
Ω	Ο	Κ	Ε	Σ	Υ	Χ	Ο	Ε	Η	Β	Ι
Λ	Ρ	Φ	Ρ	Υ	Ν	Ο	Σ	Ο	Σ	Δ	Γ
Η	Π	Ρ	Ο	Τ	Ε	Σ	Ο	Κ	Ο	Ε	Κ
Κ	Ι	Β	Λ	Ι	Β	Ε	Λ	Ο	Υ	Λ	Α
Α	Ο	Ν	Ε	Ρ	Ο	Φ	Ι	Δ	Ο	Λ	Ρ
Σ	Σ	Τ	Ρ	Ι	Τ	Ω	Ν	Α	Σ	Α	Ι



6. ΒΡΕΙΤΕ ΤΟΥΣ ΠΕΝΤΕ ΠΑΡΕΙΣΑΚΤΟΥΣ

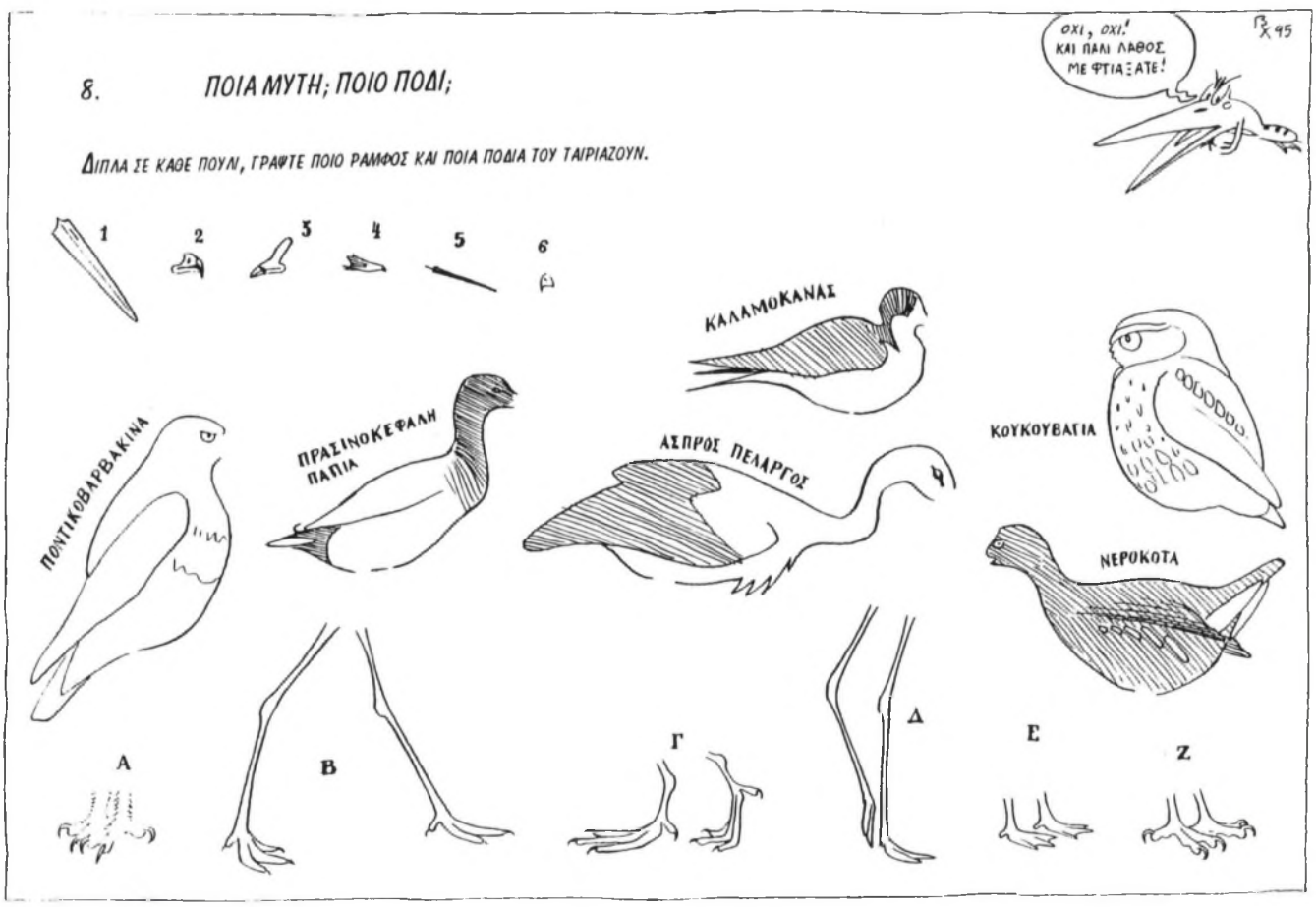
Ας πουμε οτι αυτη η ξεμδα ειναι η λιμνη. Απο τα δεκαπεντε ψαρια που ειναι στην εικονα, τα πεντε δεν θα επρεπε να βρισκονται εδω. Μπορειτε να βρειτε ποια ειναι αυτα που δεν ταιριαζουν με τα αλλα;





7. ΧΡΩΜΑΤΙΣΤΕ ΕΝΑ ΦΑΓΟΠΟΤΙ

Εχετε ξαναδει πουλια την ωρα του φαγητου;
Στην εικονα αυτη φαινονται μερικα συνηθισμενα ειδη πουλιων
την ωρα που τρωνε στο τραπεζι τους, τα ριχα της λιμνης. Χρωματιστε τα.
Μπορειτε να καταλαβετε τι τρωει το καθενα απο αυτα;

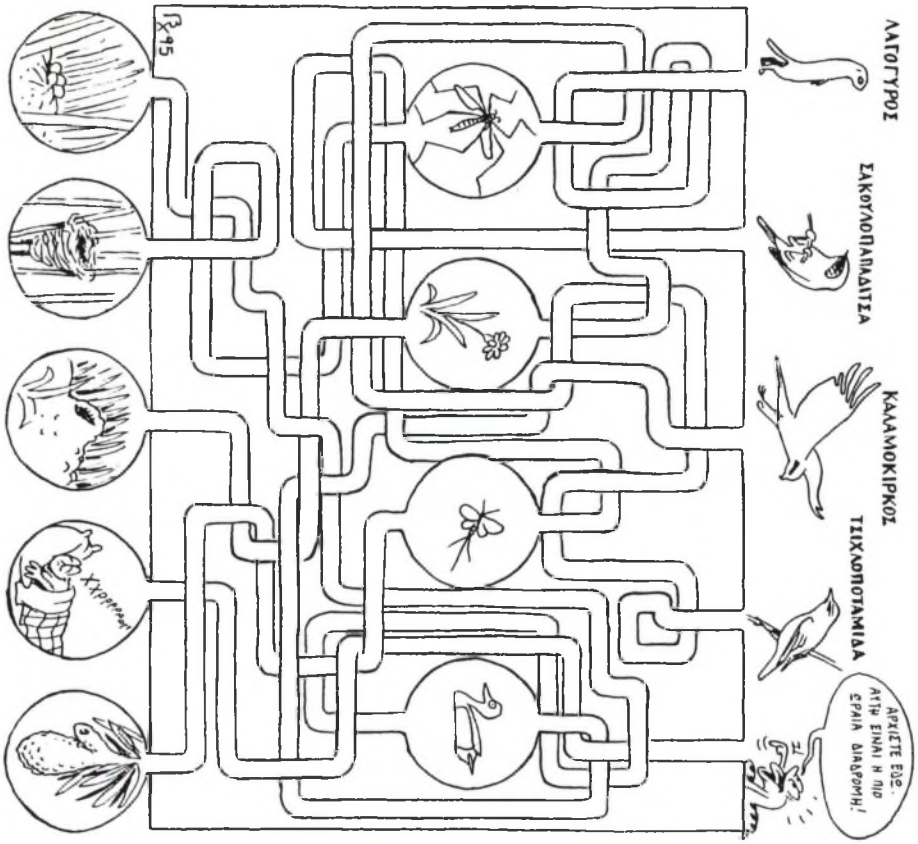


8. ΠΟΙΑ ΜΥΤΗ; ΠΟΙΟ ΠΟΔΙ;

Διπλα σε καθε πουλι, γραψτε ποιο ραμφος και ποια ποδια του ταιριαζουν.

10. ΒΟΗΘΕΙΣΤΕ ΤΑ ΝΑ ΦΑΝΕ ΚΑΙ ΝΑ ΓΥΡΙΣΟΥΝ ΣΤΗ ΦΩΛΙΑ ΤΟΥΣ

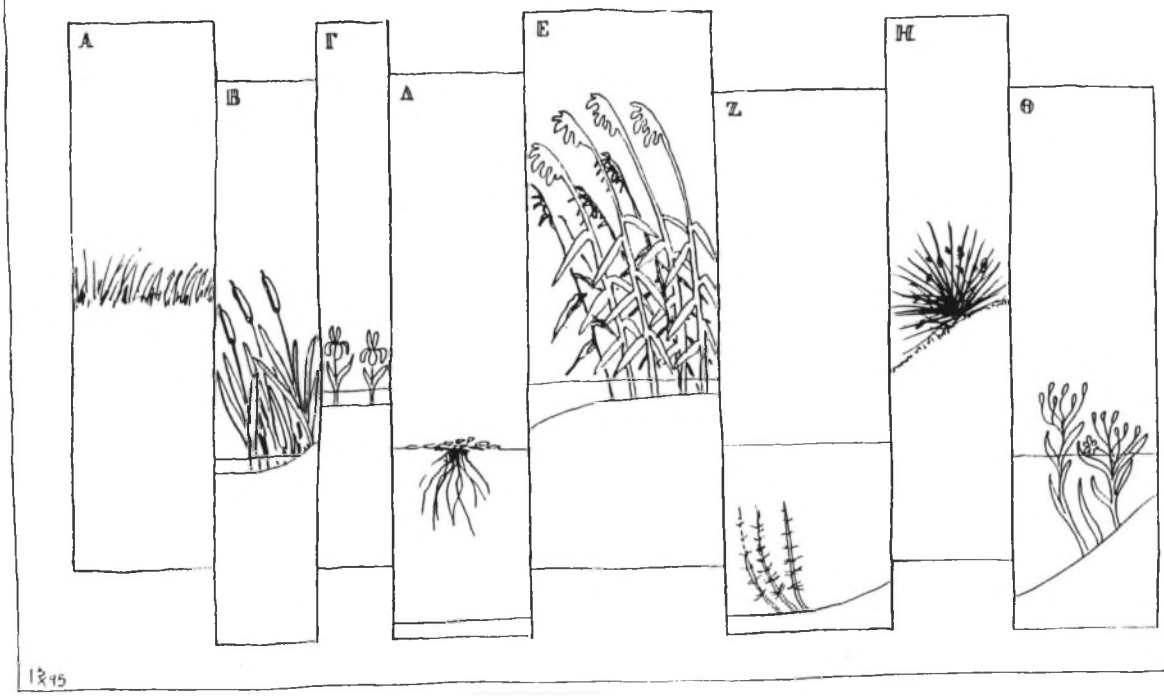
Ακολουθείστε τη διαδρομή του κάθε ζώου, για να μάθετε τι τρώει και που έχει κρυμμένη τη φωλιά του.



11. ΒΑΛΤΕ ΤΟ ΦΥΤΟ ΣΤΗ ΘΕΣΗ ΤΟΥ

Στις οχθες της λιμνης υπαρχουν πολλα φυτα. Το καθενα απο αυτα δεν φυτρωνει οπουδηποτε, αλλα εχει τη δικη του θεση. Γραψτε το αντιστοιχο γραμμα καθε φυτου διπλα στο ονομα του. Επειτα κοψτε τα ορθογωνια με τα φυτα και κολληστε τα με τη σειρα που τους ταιριαζει.

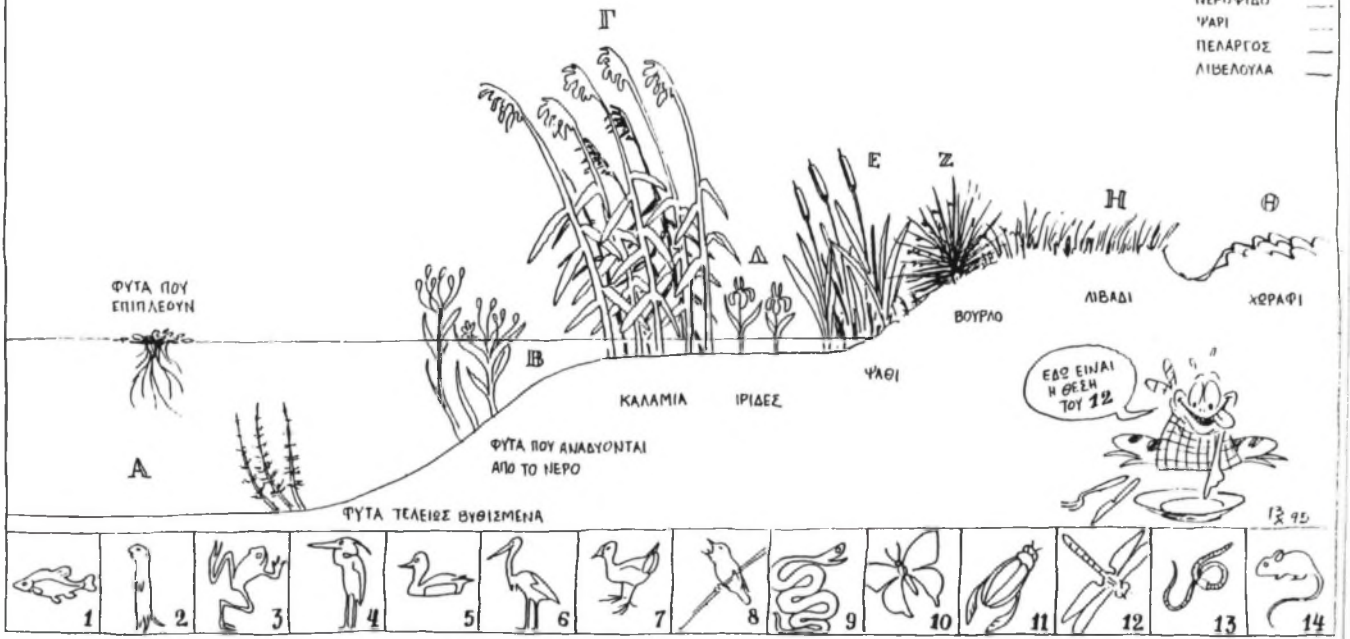
αγριοστοιδη
καλαμωνας
ιριδες
φαθια
βουρλο
φυτα που επιπλεουν ελευθερα
φυτα τελειως βυθισμενα
φυτα που ανηδυονται στην επιφανεια



12. ΒΑΛΤΕ ΤΟ ΖΩΟ ΣΤΗ ΘΕΣΗ ΤΟΥ

Σε μια λιμνη, το καθε ζωο εχει τη θεση του. Τον χωρο που ζει και τρεφεται, το ενδιαιτημα του. Γραψτε τον αριθμο καθε ζωου διπλα στο ονομα του. Μετα, κοψτε και κολληστε καθε τετραγωνακι στο μερος οπου ζει καθε ζωο.

ΕΡΩΔΙΟΣ ___
ΝΕΡΟΚΟΤΑ ___
ΛΑΓΟΓΥΡΟΣ ___
ΠΕΤΑΛΟΥΔΑ ___
ΔΥΤΙΣΚΟΣ ___
ΤΣΙΧΛΟΠΟΤΑΜΙΔΑ ___
ΓΕΩΣΚΩΛΗΚΑΣ ___
ΒΑΤΡΑΧΟΣ ___
ΠΟΝΤΙΚΙ ___
ΠΑΠΙΑ ___
ΝΕΡΟΦΙΔΟ ___
ΨΑΡΙ ___
ΠΕΛΑΡΓΟΣ ___
ΛΙΒΕΛΟΥΛΑ ___

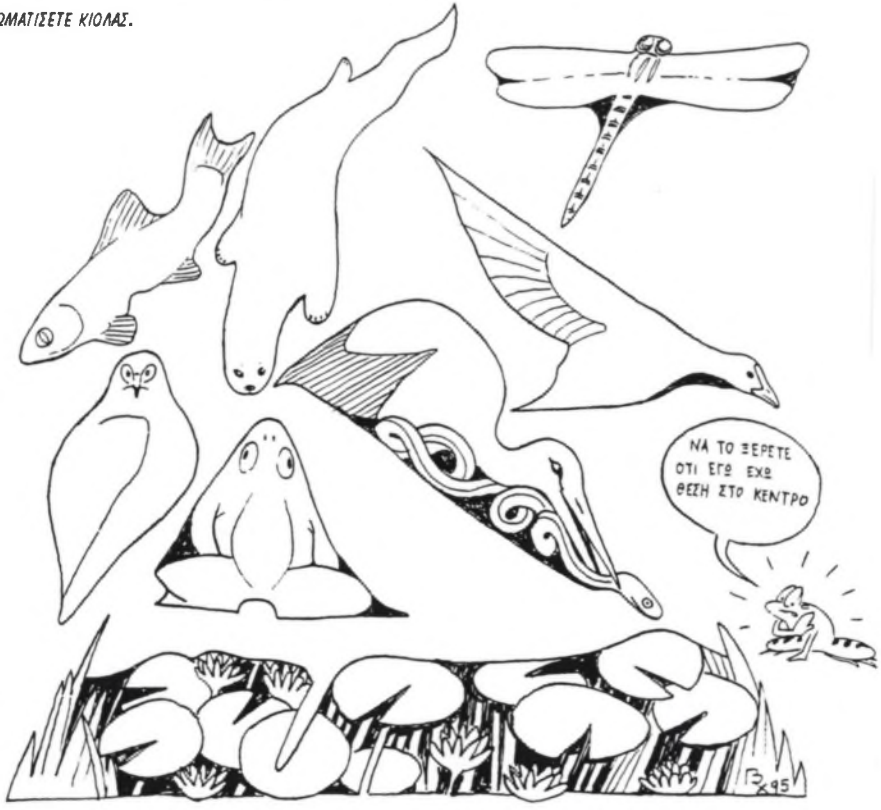


14. ΦΤΙΑΞΤΕ ΜΙΑ ΤΡΟΦΙΚΗ ΠΥΡΑΜΙΔΑ

Σε μια τροφική πυραμίδα, τα ζώα και τα φυτά ταιριάζουν, όπως τα κομμάτια ενός συναρμολογούμενου παιχνιδιού (παζλ). Ο βατράχος τρώει το έντομο, το φίδι τρώει τον βατράχο, ο πελάργος τρώει το φίδι, αλλά και τον βατράχο. Όταν πεθαίνει ο πελάργος αποσυντίθεται και γίνεται χώμα και τροφή για το φυτό, το έντομο τρώει το φυτό, ο βατράχος τρώει το έντομο,....

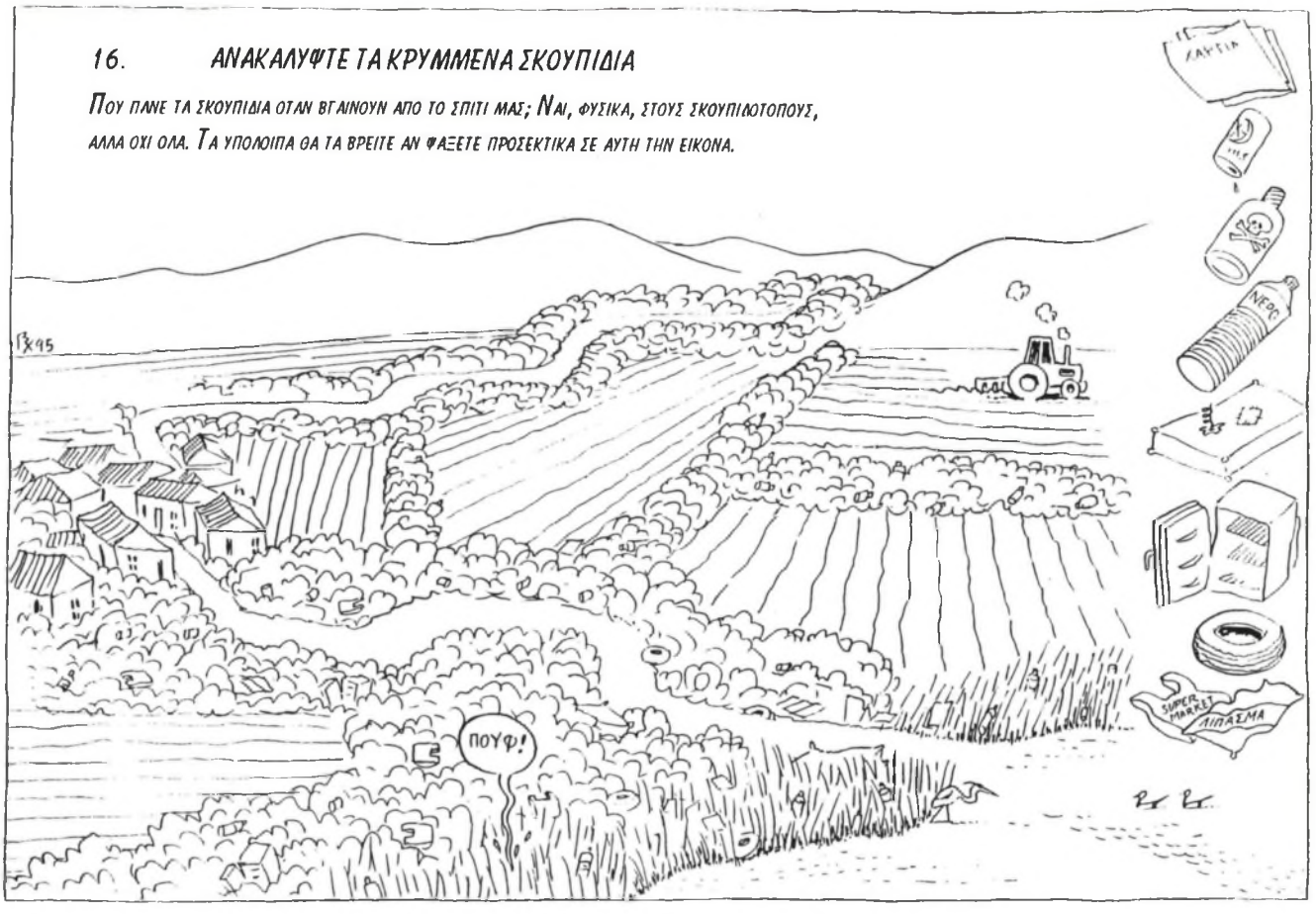
Αν χάσουμε μερικά κομμάτια, τότε στη θέση τους μένουν τρύπες και το συναρμολογούμενο παιχνίδι μας αχρηστεύεται. Έτσι και στη φύση, αν χαθούν κάποια είδη ζώων μένουν κενά που δεν καλύπτουν και προκαλούν προβλήματα: Αν χαθεί ο βατράχος, θα πεινάσει το φίδι και θα γεμίσει ο τόπος κουνούπια.

Ξέρετε τι μπορείτε να κάνετε; Κολλήστε τα σχέδια των ζώων σε λεπτό χαρτόνι, κόψτε τα γύρω γύρω και βάλτε το καθένα στη θέση που του ταιριάζει για να φτιάξετε την τροφική πυραμίδα της λίμνης. Αν θέλετε, μπορείτε να τη χρωματίσετε κιόλας.



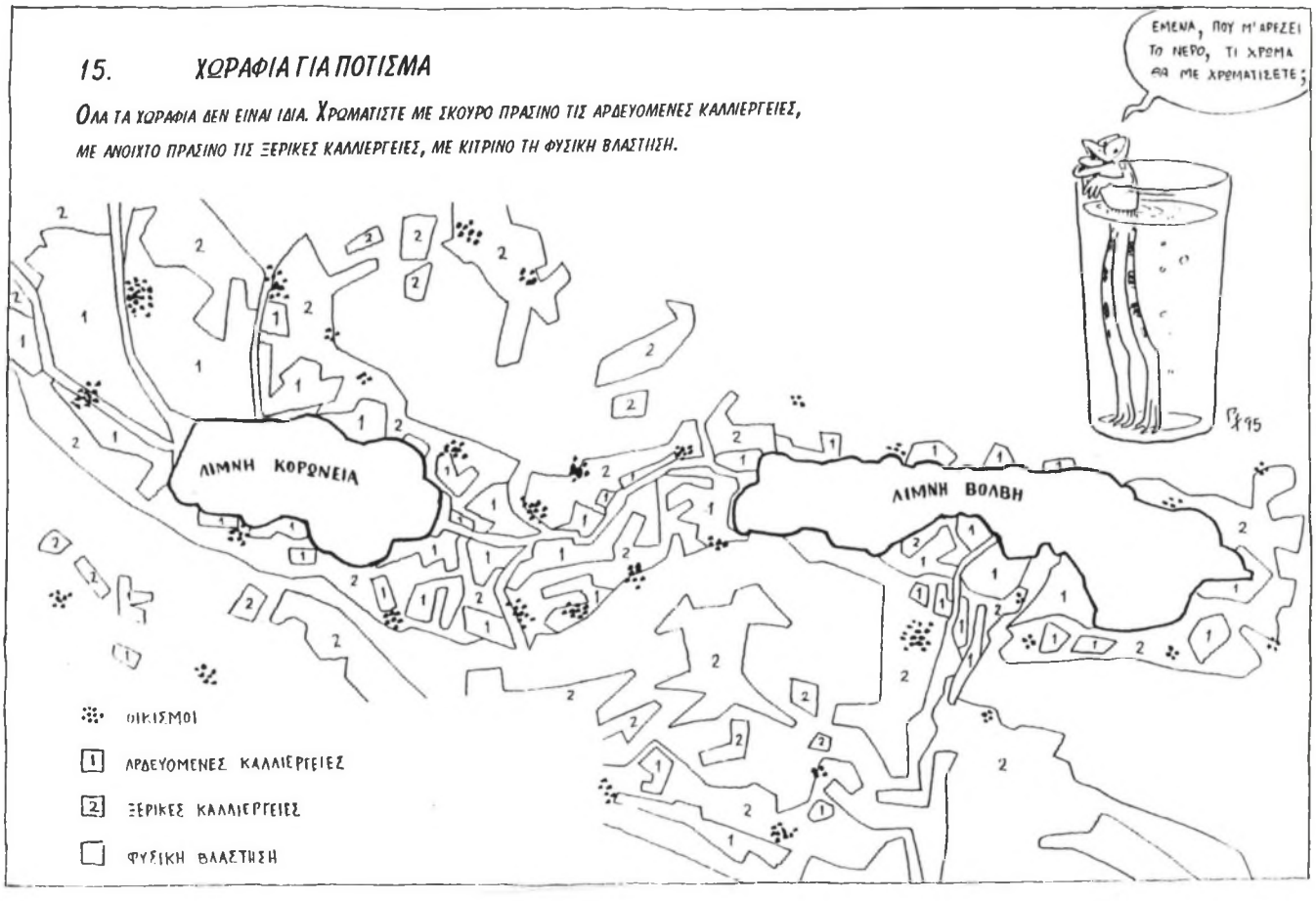
16. ΑΝΑΚΑΛΥΨΤΕ ΤΑ ΚΡΥΜΜΕΝΑ ΣΚΟΥΠΙΔΙΑ

Που πανε τα σκουπιδια οταν βγαινουν απο το σπιτι μας; Ναι, φυσικα, στους σκουπιδοτοπους, αλλα οχι ολα. Τα υπολοιπα θα τα βρειτε αν ψαξετε προσεκτικα σε αυτη την εικονα.



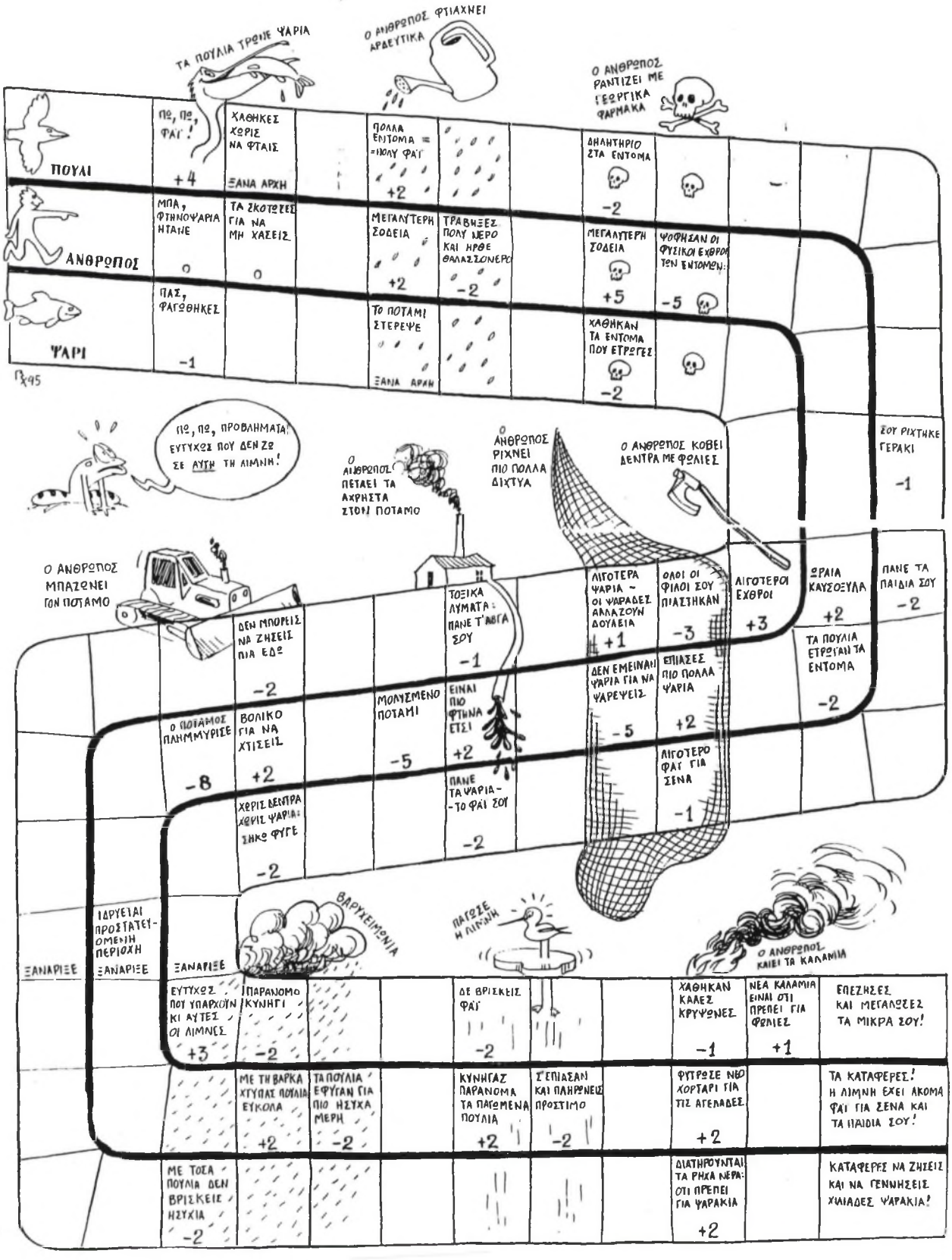
15. ΧΩΡΑΦΙΑ ΓΙΑ ΠΟΤΙΣΜΑ

Ολα τα χωραφια δεν ειναι ιδια. Χρωματιστε με σκουρο πρασινο τις αρδευομενες καλλιεργειες, με ανοιχτο πρασινο τις ξερικες καλλιεργειες, με κιτρινο τη φυσικη βλαστηση.



17. ΤΟ ΠΑΙΧΝΙΔΙ ΤΗΣ ΛΙΜΝΗΣ

Η λιμνη ειναι ενα μερος οπου κανενας δεν μπορει να φαει χωρις να σκουντησει, επιτηδες η κατα λαθος, τον διπλανο του. Πως τον σκουναει; Παιξτε το παιχνιδι και θα δειτε. Ο καθενας ας διαλεξει μια διαδρομη (πουλι, ανθρωπος η ψαρι) και ας προσπαθησει να φτασει πρωτος στο τερμα. Κι αν φτασει πρωτος, εχει νικησει; Στο παιχνιδι, ναι, αλλα στην πραγματικοτητα, οχι. Γιατι χρειαζεται τροφη για να ζησει, και την τροφη του τη βρισκει απο τους αλλους.



APPENDIX VI

Photos from the project's meetings and events

Meetings were the central actions for information and public awareness in our project. They were welcomed by decision makers, professional associations, scientists, local NGOs, and other bodies and were very well covered by the media. An impression of these events can be taken from the photos below:

1, 2 - the stand in AGROTICA '95,

3 - the conference "Lakes Volvi and Koronia: biological research and information",

4, 5 - the Interim Meeting in Nea Madytos,

6, 7 - the Closing Meeting in Langadas.

1.

2.

3.

4.

5.

6.

7.